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TREATISE

ON

THERAPEUTICS

TRANSLATED BY D. F. LINCOLN, M.D., FROM FRENCH OF

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NINTH EDITION

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VOLUME III.

1880 1 2 3 4

NEW YORK
WILLIAM WOOD & COMPANY
27 GREAT JONES STREET
1880

TROW'S
PRINTING AND BOOKBINDING COMPANY,
205-213 *East 12th St.*,
NEW YORK.

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THERAPEUTICS.

CHAPTER IX.

ANÆSTHETICS.

(Aldehyde, Sulphuric Ether, Hydriodic Ether, Nitric Ether, Chloroform, Bichloride of Methylene, Dutch Liquor, Chlorated Muriatic Ether, Iodide of Methyl, Sesquichloride of Carbon, Benzine or Benzole, Bisulphide of Carbon, Bromide of Potassium, Carbonic Acid, Oxide of Carbon, Amylene.)

History.

By "anæsthetic treatment" we signify the method of using a group of medicines which have the remarkable power of weakening or extinguishing sensibility more or less completely. These remedies are evidently similar to the antispasmodics and narcotics, with which they are connected by common properties; but they deserve to occupy a distinct place in therapeutics, both by the uniformity and the specialty of their effects, and by the rapidity with which the latter disappear after the therapeutic object is attained.

The notion of suppressing pain occurred to physicians very long ago; and in consulting the history of the art, we find that it has been attempted at various periods. We find precise indications in this respect in Pliny, Dioscorides, and other authors. Dioscorides and his commentator Mattioli mention the use of an extract of the root of mandragora, which the patient swallowed or breathed before cauterization or amputation of a limb. Late researches show that among the Chinese, in the first years of the third century of our era, a physician named Moatho gave a preparation of hemp, which plunged the patient into intoxication or insensibility, before cauterization, incision, or amputation was practised.

In the middle ages, very active search was made for substances capable of numbing sensibility at the moment of operations; Guy de Chauliac, Brunus, and particularly Theodoric, mention preparations suitable for this use. Theodoric placed at the end of his treatise on surgery a soporific

confection, made by the recipe of Hugo of Lucca, his master, which he recommends to operators under the name of "Confectio soporis a chirurgia facienda, secundum dominum Hugonem." The same surgeon gave his patients substances to inhale, in order to make them sleep, before practising operations, as is proved in the book of Canappe.*

At subsequent periods, we find, here and there, indications of the desire which surgeons have felt to find means to prevent pain. Some have proposed to make emollient, sedative, and narcotic applications to the place affected; others have suggested the prolonged use of cold, and we know that the application of ice has been made useful by Arnott in the performance of operations on superficial parts. Others have compressed the tissues in order to cause insensibility; and James Moore, an English surgeon, planned a regular system of compression, with the object of preventing or lessening the pain of surgical operations.† Liégeard, a surgeon of Caen, recommended very exact circular compression of the limbs above the point affected, before and during the operation.

General remedies were also proposed and employed for this purpose, chiefly such as produce upon the system, and especially the nervous system, an action which renders it incapable of experiencing or manifesting the modifications which are produced by the ordinary causes of pain. Natural sleep has sometimes been employed for the performance of slight and brief operations. Some surgeons have had the unlucky idea of plunging individuals who have to undergo operations into alcoholic drunkenness. The administration of haschisch has also had its partisans, and animal magnetism its adepts. Much noise was made, a few years ago, over an amputation of the breast performed by Professor Cloquet on a patient in the magnetic sleep; and Braid, and more lately Loysel of Cherbourg, have tried to establish a general method of insensibility produced by the magnetic sleep.

But the attention of surgeons has been chiefly directed to opium and the narcotics, which have been used in very various forms with the object of lessening or quelling the pain. Of these numerous methods, some have been proved insufficient or inefficacious, as the local use of narcotics; others are too uncertain in their action to be used. The magnetic sleep

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* "There be those, as Theodoric, who give them obdormiferous medicines, which make them to fall asleep, to the end that they may not feel the cutting, as *opium*, *succus morellæ*, *hyoscyami*, *cicutæ*, *lactucæ*; and they dip therein a sponge which is let dry in the sun; and when there is need, they put this sponge into hot water, and give it them to smell to, until they fall asleep; and when they are asleep, they perform the operation; and after, with a sponge dipt in vinegar and put to their nostrils they awake them, or they put to the nostrils or into the ear *succum rutæ* or *fœni*, and thus awake them, as they say. The others give *opium* to drink, and do ill, specially if he be young; and that they discover, for it is with a great combat of the animal and natural virtue. I have heard that they get madness and in consequence death."—(J. Canappe: "Le Guydon en françoys," 1538.)

† "A Method of Preventing or Diminishing Pain in Several Operations of Surgery," London, 1784.

is by no means producible in all patients; and alcoholic intoxication, not to speak of the state of degradation and imbecility into which it plunges the patient, or the disturbance of the digestive apparatus that it may produce, is untrustworthy in its effects, and the incomplete torpor which it causes may be followed by such a state of agitation as makes it almost impossible to perform the operation. Compression of the tissues is an insufficient method; it causes only numbness, and substitutes pain felt at the point of application for that which we wish to avoid in the parts situated lower down. Benumbing with cold, which, of itself, causes no inconvenience, has but a limited action, and has not as yet been applied with full success in operations on the deeper parts. Nevertheless, certain results have been obtained which authorize the best hopes. Opium and the narcotics alone might have answered the purpose, if the extent and the dangerous nature of their action had not outweighed the advantages which were to be expected.

In spite of these numerous attempts to discover means of lessening the pain, and perhaps even, in consequence of the different results of these attempts, pain was at last accepted as a necessity in operations and diseases. One of our best surgeons wrote: "The avoidance of pain in operations is a chimera which we have no right to pursue; a cutting instrument and pain, in operative medicine, are words which the patient always associates together, and which are necessarily associated." (Velpeau: "Médecine opératoire," 1839, t. I., p. 32.) It was only a few years after this decision, made by one of the surgical glories of our day, that the problem, examined for so many ages, was finally solved.

Toward the end of 1846, Charles T. Jackson, a distinguished American physician and chemist, and Morton, a Boston dentist, published the property possessed by the vapor of ether, when inhaled, of suppressing the pain of surgical operations. From America, where the discovery originated, and had been furthered by the surgical skill of Dr. Warren, it was carried to England, where the most distinguished chemists, Liston and Fergusson, proved its wonderful effects, and a few days later to France, where Malgaigne, and after him Velpeau, Roux, Gerdy, Blandin, Jobert, Laugier, etc., legitimated its established use in surgery by their successes. A few months later, in December, 1847, the discovery of the anæsthetic virtues of chloroform, made by Professor Simpson, consolidated Jackson's discovery by furnishing to practical medicine and surgery a more active and manageable agent than the one first tried. From that moment, physicians and surgeons have vied with one another in studying the physiological and therapeutical properties of these two agents, while others have sought analogous compounds which have more or less kindred properties, and the question is growing so fast as to give to the study of these two remedies the character of a new branch of therapeutics, distinct from all other known branches.

When the anæsthetic powers of sulphuric ether were discovered, it was by no means supposed that a large number of substances existed,

capable of extinguishing sensibility. The discovery of chloroform opened the way to new researches, by showing that other substances than ether possessed these properties in some degree. The researches of Simpson, Snow, and especially Nunneley, have not merely increased the number of anæsthetics, but have clearly proved that these agents had nearly the same effect on the animal system, and that it was possible to assign general characteristics to them, considered as forming a natural family in therapeutics. Nunneley's researches have pointed out certain important circumstances in the chemical character of these agents; thus, all the known anæsthetics contain carbon in binary or ternary combination with one or several of the following bodies: hydrogen, chlorine, oxygen, iodine, bromine, nitrogen, and some others; and further, that among the binary compounds the best are those in which the carbon is in neither too large nor too small proportion to the other constituents; among the ternaries, those in which the third element is in a small proportion to the hydrocarbon, and especially to the carbon; finally, that substances of analogous composition may not have an identical action, if not isomorphous.

According to Nunneley, the bodies which best deserve to be ranked with the great family of anæsthetics are seven: oxide of ethyl (sulphuric ether); the gaseous carburets of hydrogen, including common illuminating gas; hydrochloric ether; hydrobromic ether; chloroform; chloride of olefiant gas, and sesquichloride of carbon. At present the number of substances which possess the power of causing anæsthesia is much larger. The remarks which follow are chiefly applicable to ether and chloroform, for these two bodies are the only ones which have been tested on a large scale, especially by the atmidiatric method [inhalation]. We shall first examine their general effects, and shall subsequently weigh their relative value by their disadvantages; after which we shall give some details of the physiological action of the new anæsthetics.

Physiological Action.

The physiological action of anæsthetics has been chiefly studied in regard to the method by inhalation. The symptoms of those who inhale them are in general the following: the first contact of the vapors with the air-passages causes some pricking, some pain in the throat, and sometimes even a little cough or distress which provokes violent efforts to push away the apparatus. By degrees tolerance is established, breathing becomes easier and deeper, and a sort of comfort succeeds to the distress. At other times the face has an expression of astonishment, or there is active excitement with disorderly movements and incoherent words (the latter symptoms are much more common with ether than with chloroform); then the vision becomes clouded, and ideas become confused; dreams replace the sensation of reality; sensibility becomes less acute; at a later period the person remains insensible to external stimuli, pinching,

pricking, plucking the skin, and seems plunged in a sort of sleep; anæsthesia is then said to be complete. If the inhalation is suspended, the condition remains unchanged for a few moments, and then the person wakes; there is often a sort of gaiety at waking, sometimes even disorderly movements (what is called *excitation de retour*); at other times there is a kind of moroseness allied to sadness. And finally, after five or six minutes, and sometimes much longer, the patient recovers his consciousness and is in his natural condition.

This general description of the effects of anæsthetics, inhaled in the form of vapor, exhibits two forms of action which must be studied separately, since they can both be made useful in therapeutics; we refer to the local and the general action.

The *local action*, which depends on the impression produced on the respiratory mucous membrane and the organs which it covers, varies according to the duration of the inhalations. If they are not protracted, all the effects are those of excitation; there is a disagreeable pricking about the isthmus faucium, the glottis and the other air-passages, cough, contraction of the glottis with repeated movements of deglutition, and considerable increase of the salivary and bronchial secretion. On the contrary, if the inhalations are long sustained, a more or less considerable local torpor succeeds to this excitement.

The *general action*, which is the result of the penetration of the anæsthetic agent into the circulation, and thus coming in contact with the entire system, is chiefly betrayed by symptoms which show an impression upon the nervous system. The most remarkable of all are certainly the modifications of sensibility, which vary according to the length of action of the drugs, and which embrace three classes of phenomena succeeding one another in constant order; simple disturbances of sensibility, such as a gentle heat, nervous vibrations, formications, and at other times a slight exaltation of sensibility; weakening of the power of feeling, which begins with the sense of touch and soon extends to the special senses; and finally, complete extinction of the faculty. Simultaneously with disturbance of sensibility, we generally observe a perturbation in the intellectual phenomena. Attention may retard the symptoms for a time, so that intelligence is retained while sensibility is lessened. But this state cannot last long; a sort of veil soon covers the intelligence, and the patient falls into a half sleep, in which the upper lid droops, the pupil is dilated, turned upward and inward, breathing retarded, the heat of the skin lowered, and the outer world is completely shut out.

Motility is soon affected. After a few symptoms of excitement, a few involuntary muscular contractions, more or less disorderly, the muscular system falls into resolution and impotence. Yet the loss of motility does not occur at the same time as that of sensibility; all the anæsthetics affect the latter first, and the movements afterward. The voluntary movements are first affected, while those of the involuntary muscles retain all their power, and those called reflex are very frequent, and may even be

exaggerated. But if the inhalations are too prolonged, they may retard the movements of the muscles of organic life, impede the respiratory functions, and exercise a stupefying action upon the heart. But asphyxia is rare, when the anæsthetic vapors are mingled with a sufficient quantity of respirable air, in regard to which later observation has not confirmed Amussat and some other physicians, who advanced the view that the anæsthetic action was due to a kind of asphyxia.

Physiologists have made many attempts to determine the relations existing between the phenomena observed during etherization and the seat of the changes produced simultaneously in the nervous system. Flourens and Longet have especially sought to explain this part of the problem. Both stated that when an animal was forced to inhale an anæsthetic, its nervous centres lost their power in the following succession: first, the cerebral lobes, next, the cerebellum and spinal cord, and last, the medulla oblongata. In other terms, anæsthetics affect successively and progressively the organs which preside over intelligence and the balance of movement, next those which regulate sensation and motion; the medulla oblongata alone survives, and keeps the animal from death. With the disappearance of the nervous influence from the medulla oblongata, life disappears forever.

The study of the physiological phenomena observed in the general functions of the system, of the direct modifications of the nervous system, have led physicians and physiologists to divide the effects into several periods. Some, with Longet, basing their views upon experimental physiology alone, make four periods: the first, that of etherization of the cerebral and cerebellar lobes; the second, that of the pons Varolii, or surgical period; the third, that of the spinal cord, in which reflex movements are abolished; and the fourth, of the medulla oblongata, in which life is endangered by the cessation of respiratory movement. Others, much more correct and practical, like Jobert (de Lamballe) and Blandin, have regarded only the point of application; these two surgeons admit only three periods: 1, that of exaltation of sensibility and the psychological phenomena which depend on it; 2, weakening of the faculties of sense; 3, complete immobility.

Mechanism and Theory of Action of Anæsthetics.

Flourens showed that the anæsthetics have an elective action upon the nervous system; but the point was clearly fixed by the later experiments of Claude Bernard ("Cours du Collége de France," 1869, J.-B. Baillière, 1875).

The first law established by Claude Bernard is that the anæsthetic agent, chloroform or ether, must enter the circulation before anæsthesia can be produced. This law seems obvious; yet it required to be established by experiment, for Nunneley and Faure (*Arch. de méd.*, 1858) and

Ferran (*Gaz. des hôp.*, 1869, No. 38) believed that they had proved that anæsthesia of the respiratory primæ viæ could be produced directly by contact with chloroform. The latter is an error: anæsthesia of the respiratory primæ viæ, like that of distant organs, is produced by absorption (Dieulafoy and Krishaber: *Gaz. des hôp.*, 1869). Claude Bernard has performed an experiment which decisively proves the presence of chloroform in the blood in this case.

When chloroform enters the circulation, it impregnates all parts of the nervous system, and exercises its special action upon the different portions of the sensory system. But it is necessary to inquire whether the blood is the sole agent for the diffusion of chloroform, or whether an influence primarily exerted upon the nervous centres suffices to produce general anæsthesia.

If, for instance, the nervous circulation of the spinal cord is interrupted by a ligature, universal anæsthesia is nevertheless produced. If, instead of intercepting the nervous circulation, we tie the soft parts so as to prevent the passage of the blood from one half of the body to the other, the case is altered. Chloroform, absorbed by the lower half of the body, produces anæsthesia only in that portion; while if placed in contact with the upper half it causes general anæsthesia.

It follows from these two experiments that the action of chloroform on the nervous centres may be sufficient to cause general anæsthesia. But it also follows, that the interruption of the nervous circulation does not prevent general anæsthesia if the blood circulates freely. It is, then, necessary to admit that chloroform acts, not only upon the brain, but also upon the entire length of the spinal cord.

As for the nerves, they are not modified by chloroform except when in connection with the central axis.

The mechanism of local anæsthesia is quite different.

Let us now study the action of anæsthetics on the sensitive system. We find, first, that the action of chloroform upon the spinal cord is sufficient to deprive the sensitive nerves of all their properties. This seemed to lead to the inference that the loss of sensibility progressed from the roots to the periphery, which is contrary to the fact. The anæsthetic does act first upon the spinal cord; but the sensibility of the nerve disappears from the periphery to the centre, beginning at the point most remote from the medulla.

During the anæsthetic sleep, the circulation in the brain is itself modified. We now know that, contrary to what the old physiologists supposed, the brain is in a state of relative anæmia during physiological sleep. This is the case in sleep during induced anæsthesia, except at the beginning, when there is a little congestion, and at the end, when there is asphyxia. During the whole period of uncomplicated anæsthesia there is a true anæmia of the brain which has been directly proved by Claude Bernard.

The elective action of chloroform affects first the recurrent sensibility.

Anæsthesia begins with the peripheral extremity of the sensory nerves and ascends progressively. If at this time we pinch the skin, we find it insensible, and we say that the patient is anæsthetized. Yet, if the operation attacks the trunk of the nerves, the patient still feels pain, as the sensibility of the trunks is not extinct; this is very often observed in operations.

In proportion as the anæsthesia makes progress, the nervous trunks lose their sensibility, and soon the posterior roots become insensible. Finally the cells of the posterior gray cornua are affected, and anæsthesia is complete.

All the sensitive nerves are made insensible by anæsthetics, but not all at once. The nerves of special sense are the first to be affected, next the nerves of common sensibility which are excitable by touch and are capable of transmitting impressions of pain. Further, the nerves which terminate in the skin are affected before those of the mucous membranes, so that the throat is sensitive after the skin has ceased to be so.

If anæsthesia is carried too far, the sensibility of the nerves which preside over unconscious reflex actions, such as respiration and circulation, is extinguished.

This evolution is regular, and has a progressive course of such a nature that the anæsthesia can be arrested or limited at each of these periods. When asphyxia commences, anæsthesia can easily be limited; we need only suspend the inhalation in order to see respiration re-established without any real risk to the patient. But it would be rash to go further, for the circulation would soon cease, placing the patient in the greatest danger, as syncope, in such a case, may be fatal.

Claude Bernard supposes that when anæsthesia is complete a sort of semicoagulation occurs in the nerve-cell, but that this semicoagulation soon ceases, allowing the nerve to resume all its properties. If we examine a nerve in an animal under anæsthesia, we find that the tube momentarily loses its transparency.

The excitation which chloroform causes in certain secretions, especially that of saliva, is due to a direct action upon the extremities of the lingual nerve; it is not produced if chloroform is introduced by the trachea, as has been done experimentally in animals. Chloroform has no action on the motor nerves, either of the cerebro-spinal system, or that of the great sympathetic.

Such being the action of chloroform on the sensitive nerves, exclusively of the motors, it may be asked how the arrest of the heart's action can occur, to which almost all the deaths during anæsthesia are due. The explanation is somewhat difficult, and Claude Bernard thinks that chloroform may have two sets of properties, one remedial and the other toxic. But this is only a provisional hypothesis.

During that entire period which Chassaignac has called the period of anæsthetic tolerance, the pupil remains contracted and immovable. Budin and Coyne have shown that this is the case only at that period, the pupil

being variable both before and after, undergoing alternate dilatation and contraction. The fixation of the iris may therefore be regarded as the sign of the beginning and the end of surgical anæsthesia ("Recherches cliniques et expérimentales sur l'anesthésie": *Arch. de physiol.*, 1875, p. 61).

We need only mention the administration by the stomach, which has never produced complete anæsthesia, and that by the rectum (Pirogoff, Marc Dupuy, Simonin), which is so inferior to the method by inhalation both in regard to convenience and certainty. We will only describe two chief methods, the former of which has been studied with especial care—general and local anæsthesia.

I. General Anæsthesia.

Before stating the general indications and contraindications for this method, before following out the vast range of applications which have been discovered within a few years, let us dispose of some fundamental questions, which relate chiefly to the nature of the agent to be preferred, the mode of administration and the cautions to be observed, the accidents which may follow, and the means of remedying them.

Comparison between the mode of action of chloroform and that of ether.—Chloroform and ether are the agents which have been best studied, and are best known. For some years the opinion of the medical public has been generally in favor of chloroform. The surgeons who have remained faithful to sulphuric ether are easily counted; but those who use chloroform exclusively are an immense number. The adversaries of the latter are forced to admit that, as regards physical qualities, it has an aromatic odor and a more agreeable taste than ether, that its purity can be more easily tested, that its slighter volatility allows it to be kept longer; that much less in quantity is required in order to produce anæsthesia; that as regards administration, the advantage is wholly with chloroform, which may be given, as we shall see, in the simplest manner; that as regards rapidity of action, it acts much more quickly than ether, and in a much smaller dose, for two minutes are enough to produce insensibility with the former, and eight or ten are sometimes required with the latter; that as regards the nature of the effects produced, the immediate and local action of chloroform is much better borne than that of ether; that the former causes neither cough, malaise, nor a stinging sensation in the chest, and that the period of excitement which precedes insensibility is almost always absent when chloroform is used. Against all these incontestable advantages we may mention the certainty, even the rapidity of the action of chloroform, which, while allowing more complete anæsthesia, bring the separate periods of action more closely together—precipitate them as it were. Chloroform acts more quickly and certainly than ether, doubtless. But the partisans of ether have neglected one point; the same arguments

which they use against chloroform may be turned against ether, which has essentially the same action, is surrounded by the same dangers, and has caused a considerable number of fatal accidents; so that these exaggerated fears only serve to discredit anæsthesia in general. We do not hesitate to say, in agreement with the immense majority of competent men, that wherever anæsthesia is required, chloroform must be used; and that the danger may be avoided by the precautions indicated below. Jackson, the discoverer of etherization, proposed a mixture of ether and chloroform; he professes to obtain thus all the advantages and to avoid all the disadvantages.

The chief reason for abandoning sulphuric ether has been the necessity of having complicated apparatus for respiring it. A volume might be devoted to describing these instruments. The earliest consisted of reservoirs provided with tubes, or placed so as to admit air and the inhalation of the vapor; afterward means were sought for increasing the evaporation, for insuring the admixture of a proper quantity of air, and preventing the return of the breath into the reservoir by means of suitable valves; and still later, the vapor was dosed or graduated. The mechanical inhalers have been generally abandoned and replaced by much simpler apparatus, which the physician and surgeon can obtain anywhere; such as the *procédé du voile*, which consists in placing a vessel of chloroform under the patient's nose and covering his head and the vase with a thin napkin; and the *procédé du sac* (due to Jules Roux), in which a bladder is used, containing the anæsthetic, the mouth of which is applied to the nose and mouth when anæsthesia is to be produced.

However perfect these instruments might be, they all have the disadvantage of not being accessible on the instant; perhaps they also produce a tendency to asphyxia by disturbing the rhythm of breathing, and forcing it to make unusual efforts. Surgeons have from the first preferred what are called permeable inhalers, consisting of a hollow sponge, a handkerchief or a compress in several folds, or a piece of cotton wool in a horn of paper or a glass, on which are poured a few grammes of the anæsthetic; from 15 to 30 of ether (℥ ss.—i.) or from 2 to 8 of chloroform (ʒ ss.—ii.). The instrument is held under the nose.

At present chloroform is adopted for the purposes of surgical anæsthesia throughout Europe, and ether has but a few partisans; its exclusive use is almost confined to Lyons and Boston.

It is not sufficient to know how to introduce a given quantity of the vapor of ether; we must be informed of the precautions to be adopted. The "tentative" inhalations, so much praised in former times, which (as Blandin said) had no effect but that of fatiguing the patients, have long since been abandoned. But there are precautions of much more importance. The first is, *not to allow the vapors to be inhaled unmixed; to allow sufficient oxygen to enter the lungs to maintain hæmatosis.* There are two others, equally important: to give the vapor *only in the horizontal position*, and *never to give it after a meal.* In most of the cases of sud-

den death during etherization, the patient was erect or seated, or the stomach was full.

During the first period of etherization the patient is sometimes agitated by violent convulsive movements. He then has to be held to prevent his injuring himself or those about him; but too much force must be avoided, for fear that the struggle may cause accidents.

Ought we to give full or gradual inhalations? The former method consists in making the patient breathe large quantities at once, and has found more advocates among the English and Germans than among us; while the method by gradual inhalation, by which the organs are habituated (so to speak) to the contact of the vapors, by limiting the amount given, and which is equally sure and less unpleasant, perhaps less dangerous, is employed by almost all the French surgeons.

As a general rule, when anæsthesia is procured, the inhalations should be suspended; but not invariably, for when the anæsthesia is wanted for a few minutes only, there is no inconvenience in interrupting, but if the operation is protracted we must repeat from time to time, as often as the sensibility begins to return, and by alternate inhalations we must keep the patient in an insensible state for half an hour, an hour, or in certain cases even longer.

The terrible accidents of which we shall presently have to speak should not be forgotten. The anæsthetics require to be carefully watched and followed during their administration. It is prudent to feel the pulse or have an assistant feel it during etherization. If a considerable weakness or slowness are perceived, we must stop at once. We may also follow the course of etherization by the features. If the face is seen to grow pale, or the features to change, the inhalation must be stopped.

Accidents which may occur during anæsthesia.—From what precedes it will be seen that the inhalation of anæsthetic agents is not an indifferent matter, to be intrusted to any person. These remarkable effects are attended by dangers, often very grave ones. In England, surgeons carry etherization to the point of abolishing all the animal faculties, and the commencement of organic etherization. The French surgeons are more prudent in this respect, and stop when the skin loses its sensibility, and muscular resolution begins. This prudence explains why the latter have met with fewer severe accidents, and sudden deaths.

Some of the accidents are of slight importance, as those which are due to a too rapid action, or special individual conditions. Among these are cough, partial or general spasmodic symptoms, and vomiting. It is otherwise with symptoms of *asphyxia*, *syncope*, and *anæsthetic sideration*.*

There is no doubt that whenever the inhalation is well managed, asphyxia is impossible, unless we go beyond the limits which are usually observed, *i. e.*, the beginning of organic etherization. Asphyxia is recog-

* Sideration—a sudden, shock-like depression of the faculties; literally a lightning-stroke.

nized by disturbed breathing, the color of the blood, of the face, limbs, etc. Though many authors have described anæsthetic asphyxia separately, we do not think that this asphyxia can be separated from sideration. The vapors, if they interrupt the access of respirable air, undoubtedly also penetrate the stream of the circulation, and exercise their special action on the nervous centres and the central organ of circulation. The same is true of syncope. Doubtless, in some cases, a sudden nervous failure has occurred, arresting the contractions of the heart and placing the patient at once in a position of exceptional gravity; but here, as in asphyxia, sideration is most to be feared, which may, by the action already produced upon the central organ of circulation, convert a syncope of a few moments into a prolonged syncope, which may be irremediable.

The action of the anæsthetics upon the heart and nervous-centres illustrates the gravity of the accidents which we are about to describe. Death itself may occur in a very short time; but the danger need not be exaggerated. Since the discovery of anæsthetics, we may, without exaggeration, estimate the number of cases in which anæsthetics have been used by millions; all cases of severe accident and sudden death have been carefully published, and yet the total mortality includes only 77 cases of sudden death, of which 74 are due to chloroform, and 3 to ether. These statistics go from 1848 to 1862, and are divided into two very distinct periods ; in seven years, from 1848 to 1855, there were 48 cases of death by chloroform, while in eight years, from 1855 to 1863, there were only 26. During the eight years from 1862 to 1869, there were only 20 cases of death from anæsthetics, 14 from chloroform, 4 from ether, 1 from a mixture of ether and chloroform, and 1 from an alternate use of ether and chloroform (Hamaud: "Thèse de Paris," 1869). We may therefore suppose that by degrees the mortality will continue to decrease.

While the French surgeons remain faithful to chloroform, the Americans and the English are retreating to ether. In America, Bigelow, surgeon at the Massachusetts General Hospital, and Packard, at the Philadelphia Episcopal Hospital, use only ether. In England, Thomas Jones, (of St. George's Hospital) Green (of Bristol), Morgan (of Dublin), Mackensie, Jacob, Teale, and Taylor use ether exclusively; learned societies, as the Surgical Society of Ireland, the Royal College of Surgeons in London, the British Medical Association, have all pronounced in favor of ether. This is doubtless owing to the fact that the mortality from chloroform has been eight times as large as in France. The French surgeons have not yet abandoned chloroform (Perrin: "Traite d'Anésthesie chirurgicale," 1863; article on "Anesthésie chirurgicale" in "Dictionnaire encyclopédique;" and *Bulletin de thérapeutique*, 1875, t. II., p. 110).

It is certainly better to prevent accidents than to remedy them; but when they occur how should they be met? What we have said of the siderant action of anæsthetics shows that in all cases the inhalation must first be suspended, and air be given to the patient. In the great majority of cases, if the heart beats and the respiration continues, the functions

will recover of themselves. But a variety of remedies may be used in different forms of sideration. If there are asphyctic symptoms, we must use means for acting on the respiration; fresh air, movement of the chest, sprinkling cold water, blowing air into the chest with a bellows or the mouth; even bleeding, in certain cases, though we ought to be very cautious about this. In case of syncope we employ these methods, which act on the heart through inspiration; the horizontal position, with the head lower than the rest of the body, or if necessary, complete inversion of the body; inspiration of volatile excitant liquids, as ammonia and concentrated vinegar; a few spoonfuls of warm wine; frictions with flannel, a brush, or the hand, somewhat forcibly applied, and directed from the limbs to the heart, in order to carry as much blood as possible to the internal organs; ligatures around the limbs; electricity. But it is most of all important to persevere tenaciously in the use of the wines, and not to desert a patient who presents severe symptoms, or even all the appearance of death, unless we are sure that life is entirely gone. To this tenacity and perseverance certain surgeons have owed the life of patients who, if left to themselves, would probably have succumbed.

Contraindications.—Are there individual physiological and pathological circumstances in which anæsthetic inhalations are absolutely contraindicated? No doubt the age, sex, temperament, and idiosyncrasy, habit, and various special circumstances may alter the limits of anæsthesia within certain limits; but these variations, not yet well ascertained, form only shadings in the picture, and do not forbid the agent absolutely. Opinions have been divided in regard to the influence of age, and several surgeons struck with the rapidity with which anæsthetics act on children, have proposed that they should be disused, fearing the rapid occurrence of severe or fatal accidents. Other surgeons have thought that the greater shock which sometimes occurs in very old age might be a disadvantage. But on the other hand, several physiologists have proved that vital resistance seems to be greater in young animals which inhale anæsthetics; and the experience of operators has furnished an immense number of facts, in which no instance has occurred of sudden death in young children. Guersant, physician to the Children's Hospital, entertained a perfectly analogous opinion. He thought that even if chloroform were abandoned in adult surgery, it ought to be retained for children; and as regards the use of anæsthetics for the aged, the case is the same, experience has not confirmed the fears which were entertained, and which, it must be acknowledged, rested rather on theory than on well-observed facts.

The contraindications based on pathology deserve a closer examination than these. Appealing to notions furnished by the pathological action of anæsthetics, we may lay it down as a principle that these agents should not be used in diseases of the nervous centres, the lungs or the heart; but the material or functional lesion must be of a certain gravity. A simple catarrh, for instance, would not forbid their use, and the same is true of many other pulmonary affections, especially if not of a very

weakening sort. It would be otherwise in the case of those disposed to cerebral congestions due to softening of the brain, especially when there is organic lesion of the heart with small or intermittent pulse, or Corrigan's disease, or still more, when there are aneurisms of the aorta. The readiness with which those thus affected fall into syncope accounts for the absolute reserve which is to be kept. The same considerations should forbid us, in all cases where there is a disposition to syncope, especially in persons extremely weakened by hæmorrhages or by extreme anæmic chlorosis. In all these circumstances it might be feared that syncope might become fatal, owing to the sideration of the circulatory organ which the anæsthetics produce.

The other anæsthetics are little used in general anæsthesia.

Aldehyde, proposed by Poggiale, was tried by Simpson, who found it much less effective than chloroform.

Amylene was proposed by Snow; it acts promptly, especially upon children. At first received with some favor, it was tried by Giraldés, Tourdes, Debout, Robert, Velpeau, Jobert de Lamballe, Henriett, etc., but it is now entirely abandoned, both for its very disagreeable smell, and because it has repeatedly caused death, twice in the case of Snow himself.

Acetone may produce general anæsthesia, but it causes very marked bronchial irritation (Simpson).

The Dutch Liquor has been recommended by Nunneley, but Snow and Simpson regarded it as dangerous, and Robert as inefficacious.

Hydrochloric Ether has been rejected on account of its too great volatility.

Keroseline is an oil extracted from tar, and has been used at Boston by Dr. Bigelow. It is very volatile and can only be used with an apparatus. It is very little known in France.

Protoxide of Nitrogen (nitrous oxide) was first tried by Humphry Davy in Beddoes' laboratory, which provided the gases administered in the pneumatic establishment of the latter. Davy was at that time twenty years old; he breathed a few quarts, and burst into an insane laugh, experiencing at the same time the sensations of drunkenness. It is for this reason that the gas has borne the name of laughing-gas. Davy was aware of the useful properties it possessed, and said, "Pure protoxide of nitrogen seems to have, among other properties, that of destroying pain. It may probably be used with advantage in such surgical operations as do not cause a great loss of blood." In fact, he succeeded in stopping, by its aid, a violent pain caused by the extraction of a tooth.

These facts produced a great excitement, and people went in crowds to Beddoes' laboratory to observe the singular property of the gas. Unfortunately, it was not in general to be had in a pure form, and the effects were inconstant.

In 1844, a dentist of Hartford, named Horace Wells, caused a tooth of his own to be extracted under the influence of nitrous oxide, and felt

no pain ; he repeated the experiment on a dozen persons with the same success. He then went to Boston to make the trial in public, but failed. Disconcerted, he returned home and gave up his profession. When anæsthesia by ether was discovered, he went to Europe, and was a second time unsuccessful with his nitrous oxide.

In 1865, several physicians in the United States took up the remedy, and attempted to use it for operations of short duration, like the extraction of teeth. This led Preterre, a dentist of Paris, to set up an apparatus in his rooms ; and since this time many dentists have done the same.

Physicians should be informed that when this kind of anæsthesia is first seen, it seems alarming, from the livid pallor of the patient ; which is soon replaced by the cyanosis of asphyxia.

The time required for producing anæsthesia is in general a minute and a quarter, and the anæsthesia lasts from twenty to fifty seconds; at the end of two minutes the patient is conscious.

The anæsthesia and the operation are accomplished during a period of asphyxia. P. Bert has shown that at this moment the blood contains only 2 or 3 per cent. of oxygen, as in other cases of asphyxia from inert gases. In spite of this fear of asphyxia, the operation may be performed in the brief period with as much security as under any other anæsthetic ; and the operations which have been performed without accident may now be counted by tens of thousands.

The disturbance of the system is probably not so great as it seems at first sight, for anæsthesia by nitrous oxide is effected equally well after a meal, without disturbing digestion.

Cases of death have occurred. The *Gazette hebdomadaire* has reported one case which occurred in England (21 février, 1873).

Bichloride of Methylene. This body was discovered by Richardson and was experimented upon by Spencer Wells. From three to seven minutes are required to produce anæsthesia; this substance is less active than chloroform, and seems to resemble amylene in efficacy.

Dr. Morgan performed more than eighteen hundred operations with this anæsthetic, and prefers it for its rapidity. Two minutes suffice to produce anæsthesia, which is extremely brief, but may be readily maintained (*Bull. de thérap.*, 1872, II., 89).

Nitrite of Amyl and *Nitrate of Methyl* are too dangerous to be used.

Hydamyl was used by Benjamin Richardson. This is a liquid of the specific gravity of 625, boiling at 31° C. It is nearly odorless, and produces no irritation when inspired. It is remarkable for the rapidity of its action, eight grammes placed in an inhaler having brought on sleep in twenty seconds, the anæsthesia lasted thirty-five seconds, and the patient returned to consciousness in one minute. During this time the color was natural, and the pulse did not vary. B. Richardson observes that the anæsthesia occurred before consciousness was lost. The only inconvenience is the very great volatility of the substance, which causes the loss of a great part.

Alcoholized Chloride of Carbon. Hardy and Dumontpallier have proposed a new anæsthetic composed of a mixture of 30·8 parts of chloride of carbon, and 4·6 of alcohol. By distillation a body is obtained, weighing 1·44 and boiling at 66° C.; its formula is 2 (C Cl^4), C^3 H^6 O.

Though tried upon dogs, this anæsthetic ought not to be used for men unless with the greatest care.

Having thus mentioned, in a general way, the indications and the contraindications for the inhaling of anæsthetics, it remains for us to study them successively in their applications to operative medicine, obstetrical practice, and medical and surgical treatment.

1. *Application of Anæsthetic Inhalations to Operative Medicine.*

A means of lessening pain in bloody and painful operations has been sought in all ages. The inhalation of anæsthetics was first practiced with the same view; but when it was perceived that these agents relaxed all the muscles of animal life, the field for anæsthetics, at first limited to bloody operations, was afterward extended to all those in which pain was to be suspended or muscular resistance weakened. Whenever an operation is to be performed which is dreaded by the patient on account of its painfulness, or the consequences of the pain; whenever the success of the operation requires absolute rest, or previous relaxation of contractile organs, the surgeon is authorized to use anæsthetics.

There can be no doubt on this point; the introduction of anæsthetics into operative medicine has been an immense progress. On the one hand the element of pain, which was an obstacle everywhere, as an object of terror, has disappeared; and on the other hand, the operation, thus reduced to its fundamental elements by the suppression of its physiological effects, has gained in certainty of execution on the surgeon's part, who may proceed with all the slowness desired in the silence of the living organism. It has also gained in safety; for it has been deprived of that shock to the sensibility which often caused fearful nervous accidents.

The proof of this relative innocuity is found in the statistics published by Simpson of Edinburgh. He drew up statistical tables of the mortality after great operations in the large hospitals of Great Britain, Ireland, and Paris, before and after the introduction of anæsthetics into operative medicine, and he found very marked differences in favor of the new method. Before the discovery of etherization, the great operation on limbs were generally fatal, in hospital practice, in the proportion of 1 to 2 or 3; in the hospitals of Paris, according to Malgaigne's figures, it was more than 1 in 2; in Glasgow, 1 in $2\frac{1}{2}$; in the English hospitals, 1 in $3\frac{1}{2}$. In the same hospitals the same operations performed upon the same class of persons previously anæsthetized, have had a mortality of only 22 in 100, or less than 1 in 4; so that, out of 100 amputated patients in the hospitals, there are 6 who are saved with anæsthetics that would have died

without them. The proportions are still more favorable if we confine our attention to amputation of the thigh. Before etherization there was no operation in surgery which gave more fatal results; but under anæsthesia the mortality, which equalled one-half or one-third of all the cases, fell to 25 per 100. Thus by etherization * at least 11 per cent. more were saved than formerly.

These important results were fully confirmed by the figures given by Prof. Bouisson of Montpellier in his book. Comparing the results obtained in the Paris hospitals during ten years with the statements of Malgaigne made in the same hospitals from 1836 to 1841, U. Trélat found that the mean mortality has fallen by one-fifth in the case of amputations of the legs, thighs, and arms together. It is probable that chloroform forms a part of the cause (Perrin : Article "Anesthésie," "Dict. Encyclop.," t. IV., p. 483).

To these results, so eminently favorable as regards the success of the operation, we must add that nothing, to this day, has confirmed the fears which were at first expressed in regard to the possibility of special accidents. None of the accidents consecutive to operations have become increased in frequency or intensity. Those of a nervous order have been rather lessened than provoked by the anæsthetics. The general phenomena of traumatism have been usually less intense, the inflammation of the wound moderated ; and gangrene of the wound, purulent absorption, and consecutive hæmorrhage have not been found more frequent than before, though they were feared. The cure seems even to take place more quickly.

The preceding considerations show that inhalations of anæsthetics are of general application in operative medicine. There is perhaps no operation, however severe or slight, in which these inhalations have not been used. With them, surgery has been able to resume useful operations, which had been abandoned chiefly on account of the pain; as transcurrent cauterization. With them long and difficult operations have been performed, which no one would have dared to undertake under other circumstances, as the dissection of a nerve in the middle of a tumor.

But may not anæsthetics be counter-indicated in some cases by the nature of the operation? Bouisson has named five different classes; 1, very short operations; 2, those which require active assistance from the patient ; 3, those in which the patient's sensibility serves as a guide to the surgeon; 4, those in which pain is the object; 5, those made in cases where there are previous causes of stupor or immobility.

For very short operations, puncture of a hydrocele, extraction of a tooth, an incision, the opening of an abscess, superficial cauterization, or even for other operations of somewhat more importance, as tenotomy, paracentesis, phimosis, excision of pediculated tumors, and in general, for all surgical cases which require only a discreet intervention with the cut-

* This word seems to stand for anæsthesia by chloroform or ether.—TRANSLATOR.

ting instrument, it is necessary to admit that anæsthetics are not strictly required. Almost all surgeons abstain from using them in such cases; and this must be approved, when we reflect that these small operations, of themselves unimportant, have perhaps given rise to the greatest number of fatal cases. Still, the patient's sensitiveness, his fears of the operation, the fixed desire to avoid all pain, may compel the surgeon to abandon this wise principle, if local anæsthesia is not sufficient.

A certain number of operations require the active co-operation of the patient. There are some, for the extraction of certain foreign bodies, in which he must take the position he had at the moment of the accident; certain operations performed on the globe of the eye or the air-passages, in which the surgeon requires the patient to perform certain special acts. It has been inferred that in these operations anæsthetics ought not to be used. But if the patient refuses to be operated upon without anæsthesia, cannot the surgeon imitate the act artificially? Can he not, also, while lessening the sensibility to a certain point, retain the patient's active participation, by not pushing the action too far?

As for the three other contraindications, established by Bouisson, they are by no means so rigorous as that surgeon thinks. Are not, for instance, his fears exaggerated in respect to the operations in which sensibility ought to guide surgeons? Can the latter have any other guide than his medical and surgical knowledge? What are the operations in which pain is the object? And finally, can any one be authorized to make contraindications of really exceptional cases, such as those where there are previous causes of torpor and insensibility, following wounds of the head, for example?

In completing what we have to say of the application of anæsthesia to operative medicine, we have some remarks to make regarding certain operations, which from their character, their gravity, their seat, their object, or from any other cause, present matter for a special examination of their relations to anæsthesia.

Anæsthesia has its triumph in amputations, where it suppresses the pain, lessens the ulterior consequences of the mutilation, and hastens cicatrization.

Two questions deserve special attention: "How far should anæsthesia be carried before beginning the operation?" and "Ought it to be kept up during the entire operation?" Most surgeons believe that it should be stopped as soon as muscular resolution is obtained. Blandin even made it a precept, never to urge etherization beyond extinction of general sensibility; but on the one hand it is not always easy to stop at this point, as the line of demarcation between the loss of general sensibility and that of the special senses is not always clear, the latter following immediately; and on the other hand it may happen, if etherization is not pushed too far, that the contact of the instrument provokes reaction, more or less energetic, which interferes with the operator's regular action. All that can be said on this point is, that the action should be carried far enough to

produce animal etherization, but not far enough to produce organic etherization. As to the duration, it would do no harm to continue it during the entire operation, but in general it is used only during the first period, that in which the skin and the tissues forming the bulk of the limb are cut through. Ligation and dressing cause a very endurable pain, and the intoxication which lasts for some time after complete anæsthesia prevents the patient from noticing pain.

In operations upon the pharynx and the upper part of the air-passages, such as evulsion or excision of polyps of the nasal fossæ or the pharynx, resection of the tonsils, staphylorrhaphia, scarification of the glottis, etc., the opinions of surgeons are divided. In such operations, exposing the patient to the danger of receiving a portion of blood in the throat, if no warning is given by sensation, asphyxia might occur. A patient, from whom Velpeau had extracted the tonsils, shortly after the introduction of etherization into France, was nearly lost in this way. But Gerdy, Amussat, and Sédillot have succeeded in extracting polyps, and performing various operations in the neighborhood of the glottis, upon etherized persons, without any unpleasant consequences; they, however, took the precaution of not urging the anæsthesia beyond the second degree of animal etherization, and of leaving the patient's head forward from time to time, to expel the liquid contained in the pharynx. If anæsthesia were to be applied to these operations, it is quite plain that we ought not to go so far as to destroy consciousness, but to confine ourselves to extinguishing general sensibility.

Among the operations which demand great immobility on the part of the patient, and great skill and address on that of the surgeon, there are included certain ones upon the eyes. One might suppose that these would gain more facility and certainty from anæsthetics, but these hopes have not been realized. Without mentioning a circumstance which is of no small consequence, to wit, the fact that a great many operations are not painful, as the excision of pterygium, the formation of an artificial pupil, couching, opening of the lachrymal sac, etc., most of these operations can only be executed with the co-operation of the patient; and the advantages of immobility are more than compensated by the fear of disorderly movements at the moment of excitement on coming out of ether. The anæsthetic method is not then of general use in oculistic surgery; but it has enabled the operation of cataract to be performed in cases where the patient's bad behavior might have caused great difficulties. But anæsthetics have been used with full success in all operations on the eyeball, where the sight is already gone, as in excision of staphyloma of the cornea, extirpation of the globe, and all operations on the eyelids, the cavity of the orbit and even the muscles of the eye.

The anæsthetic method has been found useful in cases of strangulated hernia. Mayor, Morgan, Wright, Guyton, have obtained all that could be expected from it. It has the double advantage of facilitating taxis, and in cases of operation, of preventing the pain. In the former case, as

Guyton has shown, their action is dependent largely upon the relief of pain—pain which of itself causes resistance and contraction of the abdominal walls. In addition to this, however, by their action upon contractility, they facilitate taxis by enabling the protruded organs to resume their place in the abdominal cavity. In order to obtain all the good that is desired, etherization should of course be carried to the extreme relaxation of the muscular system, that is, to the end of the first period. The same is true when a strangulated hernia is to be set free; it is the only way to prevent thoughtless movements, and the accidents which they may cause, with the escape of a fresh piece of intestine at the moment when the strangulation is divided.

There is no doubt in cases of lithotomy. Morgan and Guthrie, Roux and Paul Guersant in France (the latter in the case of children), have shown the advantages of anæsthesia so incontestably that few surgeons would at present undertake the operation, at any age, without employing anæsthesia. Its suitability for lithotrity is not so fully acknowledged, though Leroy d'Étiolles and Amussat have used it successfully. Surgeons have had much fear of pinching the vesical mucous membrane; but skill in manœuvring may avoid this danger, and lithotomy is of itself sufficiently painful to make relief of pain a real service. Leroy has particularly shown the value of the method when the calculus is contained in the loculi of a bladder, with thick columns, from which it can much more easily be extricated when they are relaxed. Amussat has proposed in lithotrity a mid-term, which would have been acceptable if the bladder were not often very irritable, and if the first *temps* of the operation, that is, catheterism and injection of lukewarm water into the bladder, were not usually very painful. His recommendation is, not to begin etherization except for the operation itself, that is, at the moment when the calculus is to be searched for and when it is to be crushed.

The great value of anæsthetics appears most plainly in cases of reduction of dislocations and fractures, in the suppression of muscular resistance. Parckmann, Larrey, Robert, Velpeau, Bouchacourt, have shown all its advantages. In young persons with strong muscles luxations have been thus reduced, which has resisted powerful traction and well-directed efforts at reduction. The operation is made extremely easy, and the surgeon is enabled to dispense with a number of his assistants; he can do it almost alone, or with the aid of unskilled persons only. This is of high importance, not only in recent luxations, but also in old ones, in which, as soon as the pain is suppressed, less force is required, and consequently there is less risk of tearing the muscle, producing fracture, etc. In cases of fracture anæsthetic inhalations permit us to reduce without pain, but of course the remedy is not applied, except to fractures which present real difficulties, particularly where there is an obstacle in the resistance of the muscles near the fractured bone. It is hardly necessary to say that surgeons will find anæsthetics precious in case they wish to replace a vicious flexion of the limb, to extend contractured muscles suddenly, and

in general, in all operations in which freedom from muscular resistance is required. The ingenious operation of Récamier, for dilating the sphincter ani suddenly in fissure of the anus, would be barbarous without anæsthetics; but with them it is very easy of execution.

In all the operations which we have just examined anæsthesia should be carried beyond loss of sensibility, that is, to the beginning of the period of organic etherization, in order to avoid the inconsiderate movements and the resistance which the patient might make.

2. *Application of Anæsthetic Inhalation to the Art of Accouchement.*

If pain has been generally considered in operative medicine as inseparable from the action of the cutting instrument, much more so has it been regarded as a natural and necessary phenomenon in accouchement, as a sort of fatality attached to human nature: *Mulier, parturies in dolore*, as the Bible says. This conviction has been adopted by physicians, among whom the word "pains," by a vicious mode of expression, has become the synonym of the expulsive contractions of accouchement. There was, then, a real feeling of surprise when, at the beginning of the year 1847, some months after the introduction of anæsthetics into surgery, Simpson, the obstetrical professor at the university of Edinburgh, who afterward attached his name to the discovery of chloroform, published the first cases of accouchement, conducted without danger or accident, with inhalations of ether. A few days later, Professor Paul Dubois communicated to the Academy of Medicine the results of his experiments, which were soon followed by other French physicians and accoucheurs, Professor Stolz, of Strasburg, Chailly-Honoré, Colrat, Jules Roux, of Toulon, Villeneuve, of Marseilles, Molle, etc. In France, this new application of anæsthetics was at first very favorably received, but afterward had only moderate support; in England and America, however, numerous papers were published by the most renowned accoucheurs, showing how much support and credit Simpson's discovery had received. According to Simpson, the progress in the use of anæsthetics for confinement is so great that most English practitioners no longer hesitate to etherize indiscriminately all women in confinement. We shall presently see what restriction must be attached to this absolute assertion.

It must be admitted that the question of the application of anæsthetics to obstetric practice is by no means so simple as in the case of surgery in general. For the latter, it is sufficient to know if the action of the anæsthetic is free from danger; while in accouchement a great number of involuntary muscular actions must be kept in mind, which are essential to the accomplishment of the labor, and upon which ether or chloroform may exercise a more or less injurious influence. In the former case the constitution of the subject, though sometimes deteriorated by previous suffering, is far from being in the special condition characteristic of lying-in

women. There are also other questions to be solved relative to the mother and child—the degree of etherization, its indications, etc.; so that the problem already solved in the case of operative medicine, is not *ipso facto* determined in the art of accouchement.

First, what is the action of anæsthetics upon the uterus and the abdominal muscles? The capital fact, constant to-day and settled by all experiments, is that uterine sensibility is completely effaced, like all pains, by the influence of anæsthetic vapors; hence it follows that it is possible, by suppressing all painful impressions dependent on the act of accouchement, to make this function comparable to those of organic life, of which the ego is unconscious. But can this action also suppress the contractility of the organ and check labor? As regards the state of uterine contractility, opinions have differed. Simpson and Paul Dubois stated that anæsthetic inhalation in no respect weakened the force and regularity of the uterine contractions; they also observed the persistence of the reflex and auxiliary contractions of the abdominal muscles, and Paul Dubois has also noted their effect upon the reflex and auxiliary action of those muscles; and he also noted the action upon the perineal muscles, the natural resistance of which they enfeeble. Later experiments have shown that the results of Simpson and Paul Dubois were conformable to general observation. Women who inhale anæsthetics continue to have abdominal and uterine contractions, though plunged in the sleep of anæsthesia, and often are awakened after the fœtus is expelled by the noise of its crying. Yet the contractions of the uterus and the abdominal muscles may be notably modified in certain cases under the influence of anæsthetics; they may be weakened or even suspended when the etherization becomes very profound, at the end of the first period and the beginning of the second; and it is the same when anæsthetics are used too soon—before the contractions are fairly established, or perhaps when the patient is especially susceptible. Very different effects may be obtained, depending on the period of the accouchement at which we use the anæsthetic, and especially on the degree to which anæsthesia is carried. If it is superficial and well managed the contractions of the womb and the abdominal muscles persist with their ordinary energy; but in a more advanced degree, at the organic stage, etherism arrests the uterine contractions, the abdominal muscles have a feeble respiratory action, and the labor is suspended. We shall show hereafter how to make a practical application of the knowledge of these various physiological effects of the anæsthetics upon uterine contractility.

A second question is the following: "What effect may anæsthetics have upon the life and health of the mother and child?" The results first announced by Simpson and P. Dubois, regarding the influence of the etherization of the mother upon the health of the child, are fully confirmed at present. There is but an imperceptible effect upon the fœtus; its pulse only becomes a little less frequent, but soon returns to its normal condition. Simpson has published a statement of 150 labors terminated with

the help of chloroform: 149 children were born alive; one was still-born but putrefied; another died in a few days, but was cyanotic. None had eclampsia. In Magendie's statement, comprising 540 natural labors terminated by anæsthetics (360 with ether and 180 with chloroform), not one child was still-born. As respects the health of the mothers, the fears that anæsthetics might inflict some injury have not been confirmed in any way. They seem to have resulted as favorably with the mothers as with the children, both in respect to the immediate and the consecutive results. Of 1,519 women in labor who were submitted by Simpson to the influence of ether or chloroform, not one had bad symptoms attributable to that agent. Murphy, among 619 labors, does not count the death of one woman in 540 natural labors; not one death in 37 cases of application of forceps; only one death in 27 cases of version, and two in 20 cases of perforation of the cranium. Let us add that, in spite of the very free and almost general use, almost abuse, which has been made of anæsthetics by several accoucheurs in England and America, there does not exist in the annals of the art a single case of the death of a woman in labor, caused by etherization, nor even a case in which the inhalations caused a moment's anxiety in regard to the woman's life.

The consecutive accidents have been no more common than those immediately attendant upon labor, where anæsthetics have been used. The majority of the authors who have used them describe the woman as exempt from that lassitude and chill which so frequently follow ordinary labor. The anæsthetic slumber is often followed by a natural sleep of one or two hours, neither is there any ill consequence after the labor; convalescence is shorter, and in most cases the complications are rarer and less severe. We accept such favorable statements with reserve; but it is impossible not to see that the woman's system does not appear to be influenced unfavorably; and we are not indisposed to admit that in certain cases their influence may be beneficial, both as regards the act of labor and its sequelæ.

Must we conclude, then, with Simpson and a great number of obstetricians of Great Britain and North America, that these inhalations ought to be used in all cases? Simpson's argument is quite specious. On the one hand, he says, the pains of labor are excessive, or at least equal to those which accompany the majority of surgical operations; how then can we refuse to women in labor that which we grant to persons who undergo a bloody operation? And on the other hand, Simpson and his imitators report hundreds of facts of anæsthesia produced successfully both in natural and laborious labor.

Grave objections have been made to this bold generalization. We will omit the moral and religious arguments, which have had more vogue in England than here. But there are other objections with better foundations. When labor is natural, where the woman is in health and well formed, labor usually takes place without great difficulty; after a few hours of pains, rather sharp, but intermittent, and on the whole bearable,

the fœtus is expelled, and everything is in order. Where is the need for anæsthetics in this case? Do we not cause the woman to incur the risk of accidents from the anæsthetic—accidents which, however rare, must not be omitted from consideration? This opinion, which has in its favor the larger number of obstetricians in France and Germany, has found an echo in England, where its principal representative was one of their most esteemed accoucheurs, Montgomery. "Is it prudent," says he, "to interfere with every natural labor indiscriminately, however normal and favorable its aspect, however rapid its progress, in order to relieve the patient of a part of her pains, moderate as they may be, or to satisfy the solicitations of the timid, the demands of the impatient, the caprices of the fanciful? Is it prudent to give on every occasion a subtile drug, instantaneous in its effect, powerful and dangerous in its action, which when given freely has often caused unhappy and fatal results?"

While we applaud the wisdom of these remarks, and sustain the opinion that, so far as the pains of parturition are moderate, bearable and efficient, there is no decided indication for giving anæsthetics, and that, in consequence, it is best to abstain and not contradict Nature's order, we must add, for truth's sake, that recent experiments made by Houzelot and repeated at the Maternité Hospital—by an observer whose knowledge and prudence are universally known, Danyau—have not confirmed the forebodings which many persons had entertained. Fifteen women in labor were subjected by Danyau to the inhalation of chloroform. He used it only twice (with marked advantage) in the period of dilatation, for twenty-five or thirty minutes only; but in all the rest he did not give it until labor was advanced, dilatation almost, or quite complete, or even the orifice passed; and with only one exception it was continued until the end of the labor, without exceeding the necessary dose for relieving pain any more than could be helped. "During the inhalation," says he, "I did not cease for a moment to attend to the general condition, the pulse, heart, and breathing. The women, who were often very agitated previously, became calm, their eyes half-opened and swimming in a semi-intoxication, or closed; they seemed plunged in a sleep which the return of the pains did not completely dispel. The pulse was usually little modified in force and rapidity. The uterine contractions were not usually modified. In one single case they became less powerful and frequent; in another the manifest retardation of labor compelled me to abandon chloroformization at once; the labor was happily ended in twenty minutes more. The calming effect was usually obtained by small doses of chloroform. Without exceeding these doses, we have seen women who, without losing consciousness or the power to answer my questions, exhibited a semirelaxation or even complete relaxation of the limbs, replaced, as soon as the womb contracted, by quite energetic reflex movements. After the accouchement, the women said that they had suffered little or not at all, and were happy and grateful. The contractility of the womb was not deficient in any case before or after delivery; there was no hæmorrhage in any case. The sequelæ

were perfectly normal. On the part of the children there was nothing particular to note at the moment of delivery. I saw nothing that resembled asphyxia, and their health did not seem to me to have been influenced by the chloroform."

We have thought fit to take the literal words of Danyau, in order to show that, in the present state of the question, a physician would be neither imprudent nor culpable in yielding to the entreaties of a patient who absolutely demands anæsthetics for natural labor. But if, as a general rule, it is better to leave the natural function to itself, in cases of this sort, ought we to act likewise when the labor is too painful? We know that a prolongation of labor, or too acute pains, may impart abnormal severity to a natural labor. Those who are most reserved in the use of anæsthetics—Montgomery, Chailly-Honoré, Murphy, and later Danyau, have admitted their value and usefulness in cases of pain of great acuteness and severity, or where nervous pains are added to the ordinary pains of labor. "Chloroform in an attenuant dose," says Danyau, "may be usefully employed, not only in natural labors which are marked by a truly pathological severity of contractions, but also in those in which the sharpness of the pains and the length of the labor cause the woman to long greatly for a relief which ordinary means do not procure." In all these cases, anæsthetic inhalations produce the most salutary change, re-establish the proper action of the uterus, and lead the labor to a happy termination.

The period at which chloroform should be given is, then, the second period of dilatation, which is the most painful. When the uterus [os?] is once passed, the pain is less enervating and better endured. The women expect a speedy delivery, take courage, and have less need of opium. Perhaps the chief effect of chloroform is the hope it gives of escaping suffering, or the belief that without it they would have suffered much more. This hope, which has given chloroform its vogue among rich patients, is really based on very little. We may even say that in many cases the operator has only performed the semblance of anæsthesia.

Anæsthetic inhalation is chiefly in place in laborious labors, which cannot be ended without artificial aid, and especially in cases which require manual and instrumental interference; it is then that it is sanctioned by almost all competent men. If a natural or physiological cause produces too acute pains, if there is an unfavorable presentation, rigidity of the cervix or the soft parts, narrowness of the passage, etc., every hesitation should disappear, and anæsthetics become a very powerful aid to the ordinary methods. When there is inertia of the uterus, where the contractions are slow and weak, anæsthetics are absolutely contraindicated. We are astonished to see an Irish accoucheur, Beatty, recommending chloroform in cases of this sort. It is true that he begins with giving ergot, and waits until the contractions are fully established before he uses anæsthetics. But how can he be sure that inertia will not occur?

In obstetrical operations, the relief of pain is a necessity at least as injurious as in surgical operations. The use of anæsthetics has therefore

been little contested in these cases, even by those who are least favorable to their introduction into obstetric practice. In instrumental delivery, version, artificial removal of the placenta, and *a fortiori* in bloody operations, such as the Cæsarean, very few could be found at present to refuse anæsthetics. Some have expressed doubts of their usefulness in application of the forceps and the cephalotribe, fearing lest the woman's insensibility might expose her to the danger of pinching or tearing off the soft parts. But the objection is more specious than solid. When fitting rules for the introduction of the forceps are observed, anæsthesia does not increase the risk of the operation; to refuse the benefits of etherization would be to throw away a very important resource whereby facility of operation is added to suppression of pain.

To what extent should etherization be carried in obstetrics? From what we have said in respect to the physiological effects of inhalation upon the contractions of the womb and the abdominal muscles, it is easy to understand that etherization ought to be used in various degrees, according to the end sought. If an operation is to be performed, anæsthesia should evidently be carried much further than when simple relief to pain is the object. In the former case, we must effect a temporary torpor of the organ, that is, the surgical degree of anæsthesia. Especially in version the contractions must first be suspended, or at least much weakened by anæsthetics, in order that the operation may be accomplished without difficulty. The English accoucheurs, who use it so much, never wholly deprive their patients of reason and consciousness in ordinary cases. This explains how they can prolong anæsthesia in certain cases four, five, six hours and more; how Simpson made his patients inhale an ounce of chloroform hourly for several hours, and even six ounces in two hours.

Simpson, who first drew up the rules for obstetrical inhalation, recommends that it be given quickly so as to throw the woman at once into insensibility, and thus avoid agitation. For this purpose he pours into a handkerchief, folded like a cone, a "full dose" of chloroform, as he calls it. The anæsthetic effect having been obtained, he limits himself to a small number of inhalations at each return of the pain, or a little before. He makes the insensibility a little deeper, as the head approaches the perineum or vulva. In this way, he says that insensibility can be maintained for a long time without any danger to the woman. Excepting this first period of quick etherization, which seems to us by no means conformable to the principle of not pushing etherization to the point of destroying consciousness (which we have deduced from the experience of this professor and his compatriots), and for which we think it best to substitute graduated inhalation, the precepts given by the Edinburgh professor can be adopted without difficulty in obstetrical practice; but the quantity of chloroform used should be made less; from 3 to 6 grammes per hour ($3\,\frac{3}{4}$—$1\frac{1}{2}$), as Murphy uses it, or 30 grammes ($\frac{\mathfrak{z}}{}$ i.) at most, as Denham uses it in certain exceptional cases.

An observation of Dr. Tweifel's calls attention to the state of the child

at birth after chloroform has been given. Professor Hoppe-Seyler has found chloroform in the urine of a new-born child in such a case. He has also demonstrated its presence in the placenta of a woman who had inhaled for a quarter of an hour (*Revue méd.-chir. de Vienne*, 2e livraison, 1874, and *Bulletin de thérapeutique*, 1875, t. II., p. 89.)

Eclampsia of parturient women.—We are acquainted with a certain number of cases in which opium has rendered unquestionable services. By using it repeatedly and handling it with discretion, we have seen violent attacks completely suspended, and the patient become immediately convalescent.

3. *Application to Medico-chirurgical Therapeutics.*

Hitherto we have regarded anæsthetic inhalations chiefly as a means of relieving the pain which is necessarily connected with an organic act or an operation, or simply of producing more or less complete muscular immobility of the muscular system, with the object of aiding certain operative manœuvres. It was natural to suppose that these two properties of anæsthetics might be put to good use in general medicine. Pain is associated with a great many diseases besides those of operative surgery and obstetrics, and in fact, often composes the whole or a chief part of them. Are there not a considerable group of spasmodic and convulsive affections, in which the disturbance of the muscular system is the sole appreciable phenomenon? It was in these two affections that physicians first chiefly made use of inhalations of ether and chloroform; afterward, encouraged by success, they used them for the various affections of the nervous system and its dependencies; or even in cases where the intellectual faculties alone were affected.

Let us now cast our eye rapidly over these various applications. The facts are few, and it is difficult to check one by another. We shall nevertheless try to give them their true value, dividing them into the three chief groups, the disturbances of sensibility, of motility, and of intelligence.

Neuralgia—Visceralgia.—There is one group of affections in which pain is the sole and single symptom of the disease, namely, the neuralgias. Whether they occupy the external nerves, constituting the neuralgias proper, or are fixed in the nervous plexuses of the organs of the life of nutrition (visceralgias), the indication for relieving pain is so precise and urgent that the use of anæsthetic inhalation in these cases was very soon made. Honoré was one of the first to remark the good effects of inhalations of ether in a case of very intense facial neuralgia, which had been rebellious to all remedies. Soon afterward, several other physicians, J. Roux, Malle, Sibson, Semple, Broxholm, and especially Barrier of Lyons, published their results in anæsthetic inhalations for neuralgia. The latter laid down rules for this class of cases. He advises to choose the time of pain for inhalation, and to confine one's self to the production of a half

sleep. We may, without disadvantage, produce a more profound effect in persons whose neuralgic attacks are very intense, and who present none of the contraindications which are noted below. It is evident that the results will be more or less permanent according to the conditions, and that we must, if we wish for more than momentary relief, take great account of the cause of the affection, its periodicity, its idiopathic or symptomatic character, etc.

In visceralgias, properly so called, the inhalation of anæsthetics has given equally satisfactory results. They have been chiefly used in neuralgia of the abdominal organs. Duméril has given a remarkable case of the cure of gastralgia by inhalation of chloroform. Ameuille has reported a few successes in nervous colic. Bouvier has spoken of the good effects of etherization in quieting the pain of bad colic. Professor Bouisson has obtained a prompt relief of pain in renal colic by giving the vapor of ether to inhale; and in all probability hepatic colic would be quieted with equal promptness by the same remedy. An English physician, Henry Bennet, has shown the advantage of anæsthetic inhalation in relieving the pains which accompany various diseases of the uterus, especially dysmenorrhœa. Finally, there are facts which tend to show that angina pectoris, that cruel disease, has been relieved by inhalations of chloroform. Aubrun gives a case in which he thus succeeded in suspending the accesses for more than a week, though they formerly had returned several times in the twenty-four hours. Carrière of Strasburg gives a still more satisfactory case, since the inhalation was crowned with complete success.

The remarkable results obtained in Germany, especially by Varrentrapp, with anæsthetic inhalations in pneumonia, are probably referable to the influence exercised by them on the sensibility of the mucous membrane. Aran has repeated the experiments of the German physician, and finds that in slight cases the inhalation of 30 or 40 drops of chloroform thrice a day has considerably relieved these patients, and has seemed to favor the resolution of the inflammation of the lung. In very severe cases where the remedy would probably have been insufficient if used alone, the patient has always been pleased with the effect of the inhalations in relieving the cough, and even in causing sleep.

Even in regard to their control over pain, we may consider the anæsthetics as superior to the narcotics. But in their secondary application to motility, for calming the spasmodic and convulsive affections, the analogy is not so complete, and the results have been various, sometimes very favorable, and showing indubitably a curative effect, while at other times (and most frequently), they have been null or almost null, and again, they have been unfavorable, and have caused a marked aggravation of the symptoms. It is very hard to explain these differences, or to say how in two so apparently identical cases of the same affection, the one is favorably affected while the other is affected unfavorably, or not at all. This is doubtless due to some inherent peculiarity in the different cases, the key to which is unknown. Nevertheless, and in spite of the variability of the

facts, and the seemingly contradictory results, the physician ought to know them in order to use them in extreme cases where other means fail; and this is the more important, as several of these applications relate to diseases in which medicine is uncertain and feeble.

Convulsive affections.—Four convulsive affections have been specially studied: hysteria, epilepsy, eclampsia, and tetanus.

Hysteria, under the influence of anæsthetics, has given very variable results as to the direct effects, but almost always unfavorable as regards the cure. In a few patients sleep has been produced with some ease; but there are a much greater number in whom the inhalations have provoked terrible attacks, or have been followed by a profound depression of the nervous system.

Epilepsy.—In this disease the results have been even less satisfactory than in hysteria. Many experiments have been made by Krouser and Riedl in Germany, Moreau, Lemaître of Rabodange, and Rec of Montpellier. If we except Riedl and Lemaître, all are unanimous in saying that there is no reliance to be placed upon the remedy, the effects of which are often null, and at other times are so far unfavorable that the attack was directly provoked by the inhalation. Of the two whom we excepted, Lemaître is the only one who has reported a complete cure.

Eclampsia.—In eclampsia the effects, though not constantly favorable, have seemed more decided than in the two preceding affections, especially when the precaution has been taken to practice quite full bleedings previously. By the inhalations, a calm of various duration has been obtained, and in some cases when the remedy has been used repeatedly and in moderation, the attacks have been completely suspended, the patients have recovered consciousness, and have entered immediately into convalescence. Two valuable observations are recorded in the journals by Richet and Gros. Professor Simpson has lately published a curious case of eclampsia in a new-born child, which was cured by the repeated and persevering use of inhalations during more than twenty-four hours.

Tetanus.—Tetanus, as is easy to understand, is one of the affections in which most has been expected from anæsthetic inhalations. Many successful cases have been published by Pertusio, Petit of Hermonville, Théobald, Hapgood, Mignot, and Ledru, Professor Forget, Herrgott, Barth, Caigniet of Chimay, Cary, B. Cooper, Borand and others; but probably all the unsuccessful cases have not been published. In looking through the seventeen or eighteen successful cases, we are struck with the fact that most of them are spontaneous; that is, that form of tetanus which has always furnished the greatest number of cures by all methods of treatment, while the traumatic form, though rather favorably modified by the inhalations, almost always ended fatally. There is another noteworthy circumstance, to wit, that in cases of cures there has been a complete relaxation of the muscular system after each inhalation, while in less favorably disposed cases the muscular relaxation has never been complete, and the intervals of calm have always been comparatively

shorter. In general, the inhalation of anæsthetics in tetanus has seemed to act chiefly by resisting the asphyxia which is inevitably caused by the permanent tonic contraction of the respiratory muscles; but at other times these inhalations have seemed to hasten asphyxia, and Roux thus lost a patient at an advanced stage of the disease. We think it well to add, for the edification of those who may wish to recur to the inhalations in tetanus, that they may and should be repeated very often in the twenty-four hours, taking the precaution not to carry them beyond the point of calming, and relaxing the muscles momentarily. As soon as the painful contractions return, the inhalation is repeated; and thus continuously until nothing but a few slight and not very painful contractions remain. In certain cases the inhalations have been continued three days and more at intervals varying in length.

We should add a new case of tetanus treated by inhalations of chloroform, in which death seems to have been hastened by the remedy. Labbé inverted the patient and practised artificial respiration with the aid of tracheotomy; but death soon followed. This fact, communicated to the Société de Chirurgie, caused a discussion in which Lefort, Maurice Perrin, Demarquay and Chassaignac unanimously agreed in saying that if chloroform is indicated when only trismus exists, nothing is to be hoped for from it if there is generalized tetanus (Société de Chirurgie, 1869).

We must not be so absolute in cases of chronic tetanus. An observation by Simonin of Nancy, in which the patient recovered when subjected to moderate continued inhalation of chloroform, should encourage us to use this remedy (Académie de Médecine, 26 août, 1870).

There are some other spasmodic and convulsive diseases of less importance, in which anæsthetics have been inhaled with various success. We will mention among others whooping-cough in children, the attacks of which have been modified by Willis and Fourniol of Mauriac, by inhalations of anæsthetics; nervous hiccough, a case of which has been reported by A. Latour as almost instantly cured by the same remedy; nervous asthma, numerous cases of the rapid, often immediate relief of which have been cited by Leriche, Laloy, Willis, Greenhalgh, Chandler, Langlay, Beardsall; stridulous laryngitis, in which Image has quieted the attacks by inhalations; chorea, advantageously treated with chloroform by Fuster; the cramps of cholera, which several English surgeons have relieved in the same way.

Infantile convulsions.—This remedy should be used with the greatest precaution, watching the pulse attentively. With this care, the use of chloroform may be carried quite far. In 1860, we were able to arrest convulsions in a child of five years, who had been brought by them as nearly as possible to asphyxia. From six o'clock to midnight, chloroform was given almost without interruption, and the child, who was in extremities, returned to life, and is now well ("Clinique de l'Hôtel-Dieu," 3e édit., t. II., p. 187).

But we ought to make special mention of two other applications of these inhalations, made in meningitis and delirium tremens.

Epidemic cerebro-spinal meningitis.—Such is the severity of this disease that anæsthetic inhalations ought to be accepted as a precious resource in certain cases; Besseron has found them of great use in an epidemic observed by him in the hospital of Algiers, and in desperate cases. This physician subjected to etherization fourteen patients, of whom six recovered; the others, though not saved by the remedy, bore it without apparent injury. Besseron has observed a tendency to sleep, cessation of delirium, diminution of the pains in the head and spine, and the fever.

Delirium tremens.—The beneficial symptoms of anæsthetic inhalations in delirium tremens, the disease which is most remarkably controlled by the action of narcotics, especially opium, establishes anew and most clearly the relations between the latter agents and anæsthetics. The number of successes reported by the English physicians is at present quite large. In France, Bocamy and Long have been equally successful; they have agreed with the English physicians in finding that when sleep is once produced, we can be pretty sure that on awaking the patient will be perfectly well. Encouraged by the success in delirium tremens, Bouisson has tried the same treatment in nervous delirium complicating traumatic lesions, which is also relieved, though less surely, by opiate preparations. In the only case in which this experiment was made, the patient was seized with epileptiform convulsions and compelled to abandon the inhalations, but was relieved by opium.

Mental derangement.—*A priori*, there was certainly little to expect in this disease from agents which evidently act on the intellectual faculties in a very secondary way. The attempts of Rech and Fabret have been followed by no really conclusive result. The patients have been put to sleep more or less rapidly, but the calm has been of short duration, and on awaking the alienation has returned. It has been well established in the insane hospitals of France and England, that one may, without danger, calm for a moment the incessant agitation of patients suffering from furious mania and produce sleep. Casenave, of Pau, and Mac Gauvin, physicians to the asylum for the insane at Montrose, have used it successfully in analogous cases. Finally, we may employ the inhalations advantageously in the insane, either to resist the dangerous consequences of their erratic will—for example, in order to introduce the stomach-tube in patients who wish to starve themselves.

In fine, in the midst of these numerous and various complications of anæsthetic inhalations in medical and surgical practice, it is easy to see that those which have been most successful are those which depend on the primitive, and, as it were, essential action of anæsthetics. The lesions of sensibility are the most favorable cases for inhalation, as we have seen in the case of neuralgia and various exaggerated pains. If, on the contrary, we employ the secondary action, that upon motility and intelligence, success becomes more rare and less certain. In lesions of intelli-

gence, we may say that these agents are almost absolutely useless; it is not wholly so in the case of lesions of motility, but spasmodic affections proper appear to experience only slight modifications, and in many cases are aggravated by their influence. The tonic contractions of tetanus above seem accessible to the therapeutic effects of these agents. Their place in medicine will be fixed by the future; yet it is already permitted to say that this place will not be by any means as important as was first supposed. The exceeding activity of the anæsthetics as introduced by the organs of respiration, and the possibility of producing fatal accidents, will always make physicians very cautious in the use of them, except in cases where their use is in some sort necessitated by the intensity and gravity of the symptoms. The number of applications of this method, already much reduced, will be still further lessened by the injurious use of the second method of anæsthesia, which we are now to study.

II. Local Anæsthesia.

The remarkable action of inhaled ether and chloroform was no sooner known, than several physicians called attention to the good effects which had been obtained by local applications in relieving pains of various kinds. These good results were explained by the physiological experiments of Serres, Longet, Flourens, and Simpson, which we have already quoted. Nevertheless, and in spite of the success of the first trial, it is more than probable that local anæsthesia would have been very slow to find its way if an agent so irritating to the skin and mucous membrane as chloroform had continued to be used, as at the first. The method required to be regulated, its range of application to be defined, and its most useful points brought into relief. The interesting stories of Aran, communicated to the Académie des Sciences and the Académie de Médecine, gave a great impulse to the question of local anæsthesia as applied to therapeutics; we will first state the general results announced by him, and afterward return to the various applications which different physicians and surgeons have made of it.

The first of Aran's results, and one which might have been suspected *a priori* from physiological research, is that all substances possessing the power of causing anæsthesia when inhaled possessed the same power when applied locally. But it remains to be decided whether all possessed a like action in this respect. Aran soon found that this activity was different in the various substances employed, but not in direct ratio to the general anæsthetic properties. On the contrary, the local anæsthetic action is in inverse ratio to the degree of volatility of the substance used. The more volatile, the less marked is its local anæsthetic effect; which explains why ether, so potent an anæsthetic in inhalations, stands at the foot of the scale among local anæsthetics. In this way Aran tried successively many ethereal substances, the chemical composition of which was analo-

gous with the various agents reputed to be anæsthetics, and finally came upon a special fluid, which adds to the advantage of being neither volatile, combustible, nor ill-smelling, that of not being too irritating for the skin. Aran found that, of the anæsthetics, there are a certain number which produce a very active irritation of the skin and mucous membranes. Chloroform holds the first rank in this respect; applied locally, it may cause a burn in the first or second degree, while ether has no action except on fine and delicate skins, and when used in a large quantity.

Aran has given valuable details of the rules which are to be followed in the local use of the anæsthetics, showing that, in order to obtain sufficient results, it is not necessary to use anæsthetics in the large doses at first employed. Fifteen, twenty, twenty-five, thirty drops of sulphuric ether or twice that amount of chloroform, poured on the painful spot, or on a dry cloth which is directly applied, and kept in place by a piece of oiled linen and a bandage, quiet the pain very rapidly, sometimes producing anæsthesia in a few minutes. Both these agents may be used in ointment, or by friction, or simply by friction to the parts.

Generalizing the applications of the local anæsthetic method, Aran summed them up under the important practical point, that, whenever there is an acute pain in any point, whether constituting the disease by itself or only forming an integral and principal part of it, the patient may, without inconvenience, be relieved of it for a varying time by one or several local anæsthetic applications. But it is important to make a distinction. Deep-seated pains may be relieved; but the superficial ones are those in which local anæsthesia is most successful, and was first used. But, according to Aran, anæsthetic applications to the skin may also calm pain in the most deeply-situated organs of the thorax or abdomen.

An Irish physician, named Hardy, has proposed to replace liquid chloroform by its vapor directed upon the affected points by a special apparatus, which has been further studied. It has been found that in the case of certain agents, especially sulphuric ether, the effects should be referred rather to a refrigeration caused by the evaporation of the fluid than to a special action on the sensibility. In favor of the latter opinion, which he was one of the first to support, Guérard has communicated to the Société de Chirurgie the results obtained by him in throwing sulphuric ether upon the painful part, and evaporating it instantaneously by a ventilating apparatus of his own devising. If we pour ether on the skin and hasten its evaporation by a current of air, it is seen to turn white, as when a mixture of ice and common salt is used, as Lecomte and Follin found in their experiments upon the lowering of temperature caused by the vaporization of ether. However it may act, there is a lowering of temperature in the skin, very perceptible to the touch, lasting for some instants, during which time pinching, pricking, irritation, produce no other effect than a dull sense of touch. The more rapid the evaporation, the more promptly is in-

sensibility produced. If a piece of cloth soaked in ether is placed on the skin, and covered with a watch-glass to prevent evaporation, or if a finger is plunged into a bottle of ether, as Broca, Morel-Lavallée, Richet have done, covering the mouth so as to prevent evaporation, a slight sensation of warmth is felt, but little or no change is perceived in the sensibility of the parts in contact with the fluid. It is, however, true that ether, poured on a wound, or bits of charpie soaked in the liquid, and applied to a solution of continuity, will at first produce a quite painful pricking, which disappears very quickly and is followed by complete anæsthesia, which enables one to irritate or cut the edges of the wound or the denuded skin without exciting the sensibility; and the pain which formerly existed is itself first dissipated, as has been proved by Jules Roux. It is equally true that vapors of ether, directed upon wounds, have caused local anæsthesia, as Simonin has seen. It follows that, if the epidermis is in some cases a sufficient barrier to prevent the stupefying action of certain anæsthetics, as ether, the agent is not necessarily destitute of a true anæsthetic action; but this action is very feeble, as Aran has stated in the researches which we have already quoted.

In the discussion held in the Société de Chirurgie *à propos* of Richet's paper (of which we will presently speak more), the question whether local anæsthesia is double was too much forgotten. It would, doubtless, be desirable to be able to extinguish normal sensation so as to perform without pain bloody operations and thus save the patient the chances, few as they may be, of the accidents of inhalation; but, in addition to the practice of operations, there remains a vast field for local anæsthesia—that of pain properly so called, whether constituting disease by themselves, or only forming one of its manifestations.

The characteristics are not identical in the two cases. In the former, sensibility must be completely extinguished, must be depressed far below the normal point; in the second case it is sufficient to bring it back to the normal type. This alone would explain the relative inferiority of the local anæsthetic method as a means of extinguishing sensibility in operations. But, even from the operative point of view, do local anæsthetic applications deserve the contempt with which certain persons have treated them? We have a different conviction, chiefly formed from the paper communicated by Richet to the Société de Chirurgie. Richet has produced insensibility by pouring on ether, to the extent of extirpating a tumor as large as an almond in front of the sternum, and one seated on the fifth toe; he has operated upon a sebaceous cyst as large as a nut situated on the face, without causing real pain; he has, in his own case, opened a phlegmonous engorgement seated on the dorsal surface of the middle finger of the left hand without feeling the cut. The possibility of using local anæsthesia in surgery cannot be doubted. The results obtained by ether, used as an anæsthetic, are limited to operations on the skin, yet it is a great advantage, even with this limitation, since a number of small operations like the opening of abscesses, the removal of subcutaneous tumors, excision of

vegetations, operations for phimosis or paraphimosis, puncture, etc., concern the skin only.

Many cases of success have been reported in muscular rheumatic and neuralgic pains. Moreau of Tours, Legroux, Aubrun, have given several cases of lumbago and torticollis; and Martin-Solon, one of muscular contracture, cured by local anæsthesia. Benefit has also been derived in neuralgias of various regions, especially facial, cervical, intercostal, sciatic and ilio-scrotal. Briquet has successfully used fomentations of chloroform for hysterical pains situated externally. Nytterhoven and Bouisson have quieted the neuralgic pains which are so common in rheumatic and scrofulous ophthalmia. Some cases of success in migraine have been cited; and in toothache, by applying the remedy to the cheek or pouring a drop into the carious cavity. Devergia has shown the advantage of using anæsthetics in ointment for pruriginous affections.

Dr. Simon of Ronchamp (Haute-Saône), has proposed for toothache a proceeding which is generally much more effectual than those just named, consisting in placing at the entrance of the auditory meatus a little plug of carded cotton containing three drops of chloroform. The first effect is an acute sense of heat, not at all intolerable. In a few minutes the pain is quieted, sometimes completely and finally; but usually the calm is but momentary, and in these cases the return of pain calls for a new application of the remedy. We have often used this very simple plan, and in most cases have greatly relieved the patient. We will add that in some facial neuralgias, if not too violent, or accompanied by an inflammatory irritation of the nerve or its envelope, and even in some cases of intense migraine, the remedy has rendered important services by lessening the pain or completely suppressing the attack. In certain cases, especially those of women and children, chloroform, instead of being used pure, may be advantageously mixed with oil of olive or sweet almonds.

Hénoque and Fredet have shown that by pulverizing ether in front of the ear, anæsthesia of the trigeminus can be procured, sufficient to perform small operations on the face.

We ought to make particular mention of the procedure employed by Jules Roux, of Toulon, to avoid the accidents following amputations, which consists in leaving in the wound sponges dipped in chloroform so as to produce insensibility of the traumatic surfaces and prevent inflammatory symptoms. In spite of the success which has been announced it does not appear that the method has made many converts among his associates.

Professor Bouisson has published a special abortive treatment of orchitis, which he especially uses when the pain is very acute and does not yield to leeches applied to the cord, to bleedings, baths or emollients; it consists in making an anæsthetic application to the scrotum once in three hours. He says that the chief effect is to dissipate the pain of the inflammation; by the rubefaction of the skin which it causes it lessens the fluxion to the deep parts; it exercises a resolvent influence, when used continuously; in short, it lessens the duration of the disease and the

severity of the symptoms. We will make but one remark : the fineness and delicacy of the skin of the scrotum may, we think, often form an obstacle to this treatment, especially if prolonged.

In case of deep pains, we must cite the treatment of the pains of lead-colic (Gassier, Aran), of those of dysmenorrhœa (Higginson, Aran), of hepatic and nephritic colic (Aran), by local anæsthetic applications ; that of the stitch in pleurisy, and the pains of peritonitis (Aran).

Anæsthetics have been used externally for some spasmodic affections. Several physicians, including Malgaigne, have found it advantageous to make frictions with chloroform upon the vertebral column to moderate the abdominal pains and cramps of the first period of cholera. Gassier has given several cases of old and rebellious chorea treated with success by frictions of chloroform upon the vertebral column. Some good effects might, perhaps, be obtained from such frictions in tetanus.

In violent uterine pains, whether due to dysmenorrhœa or dependent on a subacute or chronic phlegmasia of the uterus, or a deep organic affection, we have advantageously made injections of chloroformed oil in the proportion of one to twenty, ten or eight. We use for the purpose a small syringe of glass like an urethral syringe, which is introduced very deeply, and the oil thrown directly upon the neck of the uterus ; a small plug of dry cotton serves to retain the oil in the vagina.

In the same case, especially when the uterine pains are moderate, we fill a gelatine capsule with two drops of chloroform and fifteen of oil. This is introduced and kept in like the belladonna.

In such circumstances Hardy advises the use of the instrument invented by himself, for directing the vapors of chloroform upon the cervix. These vapors cause, especially in the vagina, a considerable sensation of heat, more complained of by some than by others, but which soon grows less, and disappears in a few minutes. "If there is an acute pain," says Hardy, "about the genito-urinary organs, the loins, the kidneys, above the pubes, the pain is removed immediately after the feeling of heat departs ; the relief often lasts, not for a few instants, but for several hours, and the pain afterward reappears in a very mitigated form." Richardson's pulverizer is generally used at present.

Having reviewed the most commonly employed means of producing local anæsthesia, especially chloroform given locally or in the form of vapors, and ether evaporated on the skin, we are led to admit that these remedies, though certainly useful, leave much to desire, when a deep and transient insensibility is wished. But we must also say, that at the present day, treatment, and especially operative medicine, possesses a sedative agent which, locally applied, possesses a marked superiority over these local anæsthetics, both as regards convenience of application and certainty of effect. We refer to ice and the various refrigerant mixtures.

Of cold as a local anæsthetic.—Though cold, in various forms, has been used from time immemorial to combat the excess of sensibility and inflammatory orgasm in painful or inflamed parts, it is right to mention

James Arnott, of Brighton, who first made experiments producing true anæsthesia by this means. To Velpeau, on the other hand, belongs the honor of first publicly repeating these experiments, and of contributing, by his authority and example, more than any other surgeon, to spread this important invention among us.

In producing anæsthetic refrigeration a mixture is usually employed containing two parts of ice and one of sea-salt, inclosed in a bladder. The bladder is kept applied from two to five minutes or even longer, according to the degree of insensibility desired.

Ice produces insensibility in the part, by checking the capillary circulation. All superficial operations may then be bloodless. The latter circumstance may be of great advantage in certain special cases, as when a foreign body is to be searched for. In proof of this we can give a case where an English surgeon was enabled to extract a needle situated beneath the plantar aponeurosis, without giving any pain or shedding a drop of blood.

At first, refrigeration was applied exclusively to superficial operations, such as the opening of abscesses, the removal of ingrowing nails, excision of cutaneous growths, etc. But by degrees, surgeons became bolder, and the process was extended to most superficial operations, and even to those of some depth. At present it is in daily use for the removal of tumors lying just below the skin, as cysts, loupes, etc.

Until very lately, transcurrent cauterization was but rarely used, on account of the acute pain, and the extreme fear generally felt; a remedy was thus taken from our hands, which is destined to render the greatest services in a very great number of cases, as in deep and obstinate neuralgia, and especially in chronic affections of the joints. Now, thanks to the refrigerant mixture, the patient exposes himself with very little objection to the operation. An application of from two to four minutes generally suffices to make the part insensible. The skin should be wiped dry, just before applying the red-hot iron, in order not to deaden or quench its action.

Besides these very simple and rather superficial operations, there are others more complicated and deeper, to which refrigeration has been applied. Velpeau tried to amputate a breast after freezing it; in this case the incision in the skin was painless, and the patient did not suffer until the instrument reached the deeper parts.

A. Richard has disarticulated a finger after applying to it for seven minutes a mixture of equal parts of ice and sea-salt, and a fifth of sal ammoniac. He thus obtained a cold of 16 degrees (C.) below zero. The application of this mixture was quite painful, but it is said that the patient felt no pain during the amputation (*Gaz. des hôpitaux*, Sept., 1854).

In fine, we think we may conclude, with the author from whom we borrow the great part of these facts, that the rapidity of its action, the constancy of the effects, and the absence of subsequent injurious inflammatory reaction, are points showing that refrigeration by a mixture of ice

and salt is an anæsthetic of the greatest value (*Union méd.*, janvier, 1858). We will add, that in view of all these advantages, the process, which is becoming more and more popular, seems to us destined to become an almost indispensable ally of operative medicine.

We will now mention some new anæsthetics which are specially applicable to certain mucous membranes, especially carbonic acid gas and oxide of carbon gas.

Carbonic acid.—The sedative properties of this gas were long suspected, but Simpson first proved by positive experiments its anæsthetic virtues as applied locally to the mucous surfaces of the vagina and uterus.

In view of the good effects obtained by douches of carbonic acid, the French surgeons eagerly took up the new method. Most of the carboniferous substances were submitted to experiment, and it was found that among them the oxide of carbon and carbonic acid possessed the most remarkable sedative properties.

Among the various painful affections in which douches of gas have been used with most advantage we may note muscular rheumatism, superficial pains, and especially neuralgia of the uterus or neighboring organs. We particularly spoke of the results in carcinomatous ulcers of the womb. If the douches have not as yet proved victorious over these very grave affections, which are generally thought incurable, it cannot, at least, be denied that they usually have imparted relief for some time, in cases where medicine has been almost impotent to obtain even temporary relief.

We do not describe here the local anæsthesia obtained by oxide of carbon, bisulphide of carbon, and electricity, since these procedures are dangerous or insufficient.

In fine, anæsthesia has entered on a new course. On all hands, experimenters are searching for new agents which shall have a local action sufficiently *constant*, sure and powerful to rival inhalation.

The tendency is good, and the search is praiseworthy. Too happy, indeed, would patients be, if they could enjoy the blessings of anæsthesia without the disadvantages, the dread, and the danger which is inseparable from the inhalation of chloroform and other similar agents which, after all, act only by intoxication! With agents of such energy, it will always be dangerous to attack the nervous tree by the roots; let us, then, learn how to produce anæsthesia by the other extremity. Here lies progress, and to this ought all efforts to tend. Success cannot be doubtful; the results already obtained are a guaranty of new conquests. The time will come, we hope, when local anæsthesia, by the power as well as the harmlessness of its effects, will, in the majority of cases, replace general anæsthesia, that sovereign but terrible remedy, which, while it extinguishes sensibility and pain, abolishes at the same blow consciousness and will, and which, in the midst of its marvellous sedative properties, conceals a principle of destruction and a menace of death.

CHAPTER X.

ANTISPASMODICS.

Valerian.

Epilepsy.—It is surprising that valerian has been praised ridiculously for the treatment of a disease in which it has no more power to cure than any others, while it is scarcely mentioned in the treatment of a crowd of other affections, in which it may be used to the greatest advantage. Described by Dioscorides and Ætius, known to Aretæus, who used it, it disappeared, until it was drawn from a long oblivion by Fabius Columna, a Neapolitan of illustrious origin, who had the misfortune to be an epileptic. Having exhausted all imaginable remedies, he devoted himself to botany, to seek among plants for some relief; and toward the end of the sixteenth century he says that he was perfectly cured by valerian, and obtained as decisive success in the case of several friends who had the same illness. How far can we believe such a story? Diagnosis is better understood now than in his time; but we find so many physicians confounding hysteria and other sorts of convulsive disorders with epilepsy, that one may doubt, without being charged with scepticism, the value of the observations of the noble Italian. He has given very small evidence of his medical capacity; his works are those of a naturalist rather than a physician.

This does not finish the anti-epileptic rôle of valerian. Destined to few but brilliant successes, it reappears after a century under the auspices of Dominico Panaroli, a distinguished physician at Rome, who cured by its aid an epileptic fisher whose attacks returned two or three times a day, and who, as the author says, had obtained no relief from the pertinacious use of the most energetic remedies in epilepsy, such as the elk's foot and the human skull. If such observations are unconvincing, a certain degree of confidence must be granted to those reported in large numbers by Holler, de Haën, Sauvages, Willis, Marchant, and especially by Tissot and Quarin; and by Boerhaave, who did not regard valerian as the specific for epilepsy, but allowed to it a certain power. These authorities are certainly imposing, but a question of this sort is perhaps harder to judge than those great practitioners thought.

Let us try to show the right and the wrong side of these statements.

As regards gravity of prognosis, and in consequence, the efficacy of different treatments, it is important to distinguish epilepsy well from the epileptiform convulsion.

Epilepsy is a disease by itself. The epileptiform convulsion, on the contrary, is the convulsive and apoplectic form of epilepsy, *minus* epilepsy: that is, it is a morbid modification of the system which borrows for its manifestations the form of epilepsy, and nothing but the form. In the hospices of Bicêtre, and La Salpêtrière, we find the true epileptics; and how few are cured! Yet it must be remarked that epileptics often pass several months or years without attacks, though not ceasing to live under the immovable weight of the disease which is only dissimulated, in order to become more threatening and destructive. Experience shows that any treatment, even the most insignificant, may thus arrest the disease, sometimes by its intrinsic virtue, but more often by the good impression it must produce upon the mind, the hope of success which attends each fresh trial; but we repeat that the disease is only palliated; and we do not deny this palliative power to valerian.

Epileptiform convulsions.—In respect to their phenomena, these differ in no respect from epilepsy, but they are dangerous only in virtue of the varied courses on which they depend. The name of eclampsia is given to those which attack women in labor, or children. In these cases they are grave, and valerian has some effect when it can be given. Those which mark the commencement of certain exanthemata, as small-pox, etc., disappear as the eruption appears. In certain non-epileptic young girls the first appearance of menstruation is preceded by some attacks, which disappear as soon as the function is developed. In certain cases of wounds of the head, meningitis, encephalitis, cerebral tumor, and intoxication, etc., there are epileptiform attacks in non-epileptic persons. This important distinction sufficiently accounts for the success which has been attributed to valerian in "epilepsy." Those who know how much an attack of epilepsy in an epileptic is like an epileptiform attack in one not epileptic will readily see that it is not always possible to avoid the illusion which has led a great number of physicians into error regarding the value of valerian. Attacks of hysteria which, up to a certain point, resemble epilepsy, and are sometimes cured by valerian, have deceived others. Worms often cause epileptiform convulsions in infancy; valerian, which has quite active anthelmintic powers, has thus cured the epileptic form by destroying its occasion. It may, however, be given in epilepsy, especially if recent, in order to relieve the attacks and lessen their violence; this is all that we can hope to obtain; but it must be used in large doses, for a long period, for a year and often longer, suspending its use from time to time in order not to fatigue the stomach.

In some victims of epilepsy, the attack begins with it a symptom called epileptic vertigo. It has seemed to us that valerian did somewhat weaken the intensity and frequency of these vertigos, which are a milder expression of epilepsy, the prognosis of which, however, is not less grave than that of the most complete convulsive attack.

Nervosism.—The skilful use of valerian is most valuable in the diseases of women; but there are certain cases in men, which, by the laws of

legitimate analogy, require its use, and yet generally resist it and yield to other antispasmodics, and the cases of young girls before puberty are in the same category. The nervous troubles which chiefly occupy the middle period of woman's life almost all spring from the uterus, which seems at that time to subject to itself the whole nervous system, and, removing from the regulative influence of the brain the instruments of sensation and voluntary motion, to deliver them over to the disorder and irregularity which characterizes hysterical disorders, and that group of anomalous acts in the animal life which cannot be better designated than by the name of *nervous state, spasmodic state.*

The first conscientious statement of the properties of valerian are buried in two very obscure theses sustained, the one at Halle, the other at Amsterdam, in the beginning of the last century. The authors (J. Fred. Bismarck and J. Fred. Stancke) experimented with it in the cases in which it is of real value. Hill and Marcus Hertz subsequently perceived its true action. But instead of citing authorities, let us try to appreciate all the shades of the indications which may be filled by valerian.

Hysteria.—The eye of the true physician, in observing hysteria, sees in it a general neurosis, which stamps with its own seal and nature all the neuropathic series, which extends from the most trifling "vapors" to the frightful attack which deserved the ancient name of "hysterica passio." This series is composed of protean accidents, with pathological appearances proper to women—appearances so mobile, so indeterminate, that the nosologists have only been able to classify them in a generic way. We experience the same difficulty with them; yet it is right that physicians should listen to us. These maladies are vaguely indicated by the name of *spasms*, *vapors*, or better (with Tissot) *nervous ailments* (maux de nerfs). In one case they are chokings, palpitations, a sense of strangulation, a constriction of the temples, etc.; in another, beatings, various noises in the head, transient coryza, partial chills, waves of heat or cold in the face, etc.; one complains of eccentric impatience, nervous shocks and thrills (crispations, agacements), which compel involuntary movements, tossing of the body with yawning and the general movements which accompany it, and hiccoughs which too often are preludes to the severest symptoms; another speaks of dysphagia, borborygmi, flatulence, burning in the intestines, tympanites appearing and disappearing with suddenness, anxiety of the præcordia, panic fears, vain susceptibility; some sum up the picture in two words, which, in the eyes of the physician, paint its fluctuations strongly enough: "I have trouble with my nerves; my nerves are in movement," etc.

Valerian is quite successful in calming these nervous symptoms; and what is surprising, it succeeds the better as they are less like the true attacks in form and intensity. As regards the latter, valerian can make its return less frequent, and its violence less; but, we repeat, it modifies hysteria all the better, as its forms are less complete and more unusual.

The hysterical attack, when severe, leaves after it various nervous

troubles in which it is well to give valerian; such are hemiplegias, circumscribed paraplegias, especially of sensation; formications, intense headaches, partial congestions, flatus, palpitation, aphonia. In certain cases, there exists a peculiar febrile movement as the common bond among all these very mobile nervous symptoms; it is characterized by a frequent, large and developed pulse, a soft and moist skin, a face greatly injected, and a little dyspnœa. This fever, which may be called hysteric, sometimes yields to the present treatment.

There is one of the thousand revelations of the hysterical state which is neglected or little mentioned by authors, which we have seen several times, and which is completely dissipated by valerian; we refer to an indefatigable muscular orgasm which irresistibly forces a woman to walk, to move, giving her the sensation of an invincible power and of the pressing need of undertaking painful exercises. If they then take a few doses of valerian, they are thrown into a state of lassitude and muscular weakness which takes from them all desire to run and move; it is like the instant relaxation of a string which was in full tension.

Observations presented by Dr. Guillemin to the Société de Thérapeutique would seem to show that inhalations of ethereal tincture of valerian during attacks of hysteria had put an end to the attacks, after a certain excitation. Believing that we might find in antispasmodics, given in this way, the means of curing the attacks, we have repeated the prescriptions of Dr. Guillemin many times, but we must say that they have given no satisfaction.

Vertigo.—The most positive indication for valerian, after that which we have just named, is drawn from vertigo. There are persons who often have vertigo, haze before the eyes, giddiness, identical with those which are forerunners of apoplexy, but without any such serious consequences in their case. Bleeding, which would disperse such symptoms in apoplexy, only makes them worse; while valerian relieves them quite well, and the service which it renders is one of the most valuable which the remedy is called upon to render. This kind of vertigo at last becomes very troublesome, and often is a very serious sign of evil.

Chorea.—Several authors of the last century attest the virtues of valerian in this disease; and they agree with us in one point, to wit: that their observations have been almost all made upon young girls. Strandburg and Carminati praised its effect in migraine. It is hardly to be relied upon except in cases associated with the hysteriform troubles we have enumerated. It is the same with certain gastralgias which are dependent on the same cause, in which case alone it is useful. These two affections, especially the former, sometimes produce, as a consequence of the acute pain they cause, a general spasmodic condition which also calls for valerian.

Anæmia.—It has been often found by all physicians that the nervous excitability increases in direct proportion to the loss of blood, which explains the frequency and the intensity of the diseases dependent on anæmia in women who have been lately confined, or have menstruated pro-

fusely, or are chlorotic or debilitated, owing to excessive letting of blood. The most violent nervous troubles can be excited at will by fasting, too prolonged diet and artificial loss of blood. All these accidents may be calmed by antispasmodics, especially valerian, provided that the blood, that first-rate antispasmodic remedy, has been brought by a proper analeptic diet to the support of the nervous system, giving to it the fixity required for maintaining its balance. The same is true as to phlegmasias, fevers, and all affections in which, whether through carelessness or the urgency of symptoms, too much blood has been drawn. We then see spasmodic symptoms which can be parried by valerian, and which in their disappearance allow the phlegmasia to become resolved, and the disease to pass favorably through its periods. At the close of severe continued fevers, when adynamia, and especially ataxia, follow abundant nosebleed or bleeding from the bowels, when the abdomen is tense, indolent —when, in a word, the nervous incoherence is in combination with debility—there is everything to gain and nothing to lose in prescribing valerian. We say the same in regard to the same symptoms when they appear during exanthematous fevers, owing to retrocession of the eruption (which is very common, especially in scarlatina), or when from any other cause they bear the stamp of feebleness or malignity.

Menopause.—Though some of the troubles which occur at the critical age are hyperæmic and demand depletion of blood, there are many cases when the uselessness or even the harmfulness of this treatment proves that the cause is quite different. We have very often seen these symptoms—consisting chiefly of palpitations, attacks of dyspnœa, vertigo, headache—yield rapidly to the use of a few grammes of powdered valerian, or the infusion taken in injection.

Polydipsia.—We have recently seen this strange disease very much benefited by valerian. Rayor used this treatment for a young boy, in the Charité, who was consumed by a quenchless thirst, and who made water in proportion to the enormous quantity of drink that he took. The urine was very light, almost like water; without odor, color, or taste, and excessively abundant. He did not lose flesh; he ate a good deal, and in other respects enjoyed perfect health. This very simple polydipsia and polyuria were probably caused by a nervous affection, and had no other point in common with diabetes than the excess of urine. Under the influence of powdered valerian, already used with success by Rayor in analogous cases, the thirst and the excess of urine all at once diminished—in the space of three or four weeks. Several kinds of treatment, including that with opium in particular, had wholly failed. We have had analogous success in an hysterical woman, whose case was given by us in full in the *Journal de médecine* (mai, 1844).

In 1854, at the Hôtel-Dieu, we treated a patient, aged thirty, who had long suffered from polydipsia with polyuria. He drank every day 32 quarts of ptisan, and urinated to correspond. The urine, very frequently analyzed by Bouchardat, never presented the least trace of glucose. It

was remarked that the skin of the face was often the seat of an extremely intense erythema, without fever, which coincided with an exaggerated thirst and excretion of urine, and disappeared in two or three days, to reappear shortly after. The health was quite good.

This odd discharge, which somewhat resembled the ordinary flexions of nervous women, would have led us to give valerian if we had not already been acquainted with the facts above stated. We gave extract of valerian, which was successively raised to the enormous dose of 30 grammes (℥ i.) per day. The thirst, urinary secretion, and erythema diminished together, and the cure was complete at the end of four months of treatment. Later we saw the patient again, and his health was still very good. From that time we have many times had occasion to apply the treatment in polydipsia, and it has almost always succeeded.

Since this substance in no way affects the general circulation, and produces congestion of no particular organ, it cannot be a direct emmenagogue; if, then, it ever becomes such, it is by putting an end to the nervous symptoms which opposed the discharge. In some dysmenorrhœas, preceded for a day or two by painful and non-inflammatory swellings of the belly, it likewise facilitates the menstrual flow. The flatulence which comes after eating, in nervous women and in hypochondriacs, is often dissipated by a slight infusion of valerian.

Amblyopia.—After the anti-epileptic virtues of valerian, the ancient authors chiefly praised its specific action in certain diseases of the eyes. Bismarck thus begins his dissertation: "Dico quod radix valerianæ hortensis sit cephalica, uterina et ophthalmica." He might have limited himself to the first two chapters, as we think. In commencing amaurosis, in the dimness of vision (caligo oculorum) common to old people, to men of the desk, and certain classes of laborers, it has been so praised that, as the author says, "ocularia a quibusdam nominatur." Ettmüller goes farther: "Virtus ejus antiophthalmica non potest satis decantari." Stancke better understood the shade of indication which can render its use legitimate in affections of the eyes, when he said: "His solum modo medetur oculorum morbis qui a nervis oriuntur." Himself subject to dimness of sight, to slight hallucinations, he cured himself with valerian. But these symptoms are proper to the brain rather than the eye, and we have spoken of them above.

Neuralgia.—The valerianate of ammonia, for a moment accepted with enthusiasm, soon fell into oblivion. It was said to act in an astonishing way in rebellious neuralgia. At present this is not thought of; but it is not impossible that it may be of some use.

Worms.—We will only mention its vermifuge action, as we possess the semen contra, the Corsican moss, etc.; nor its febrifuge properties, though a great number of facts reported by Bauhin, Bouteille, Miocchi, Carminati, M. Vaidy, allow us to entertain some confidence in them, since we have quinia and its substitutes, etc. Junker spoke of it as a diuretic and diaphoretic in retrocedent exanthemata. In nervous asthma it is far from useless, as we have lately ascertained.

Mindererus used it as an application to limbs enfeebled by old affections, and to the head in migraine. It has been used to make amulets against poisoners, and, according to Agricola, to double the powers of virility. It would not be impossible that its very odor might slightly excite the nervous system.

We sum up the proper action of valerian thus:

It is useful in the indeterminate series of nervous accidents which arise under the control of hysteria and vaporous affections, whether they appear singly or in groups; it has also a deserved reputation in nervous vertigo.

Asafœtida.

The name of *laser*, or *laserpitium*, by which this drug was designated in the writings of Hippocrates, Dioscorides, Celsus, Galen, and others, was applied by others to special preparations of this substance. We may admit this controverted point, which has been maintained with success by a majority and by those of most authority; however, the Father of Medicine frequently uses it, especially for women suffering from abortion, to whom he gave it externally and locally, and at the same time internally, also advising that it be made a part of the ordinary diet. He discusses the indications and contraindications, and speaks at length of its natural history. We will observe that the particular case in which he praises asafœtida in no respect contradicts the nature of the properties which have at all times been attributed to it; and if we may be allowed to interpret the rules of the wise empiricism which then guided him, we will say that he very probably succeeded by its aid in quieting nervous symptoms, the colics and tympanites, which so often accompany and follow abortion.

It is very remarkable that Dioscorides can furnish us with the text of what we have to say of the best-known qualities of asafœtida. According to him, it cures "cough, disorders of the arteria trachea, alterations of the voice, and hysterical troubles." Celsus also assigns to it one of its best-known properties: "Item laseris quam optimi paulum devorare opus est," etc., as he says in his chapter "De tussi;" and farther on, "Lac cum allis coctum, sorbitiones quibus laser sit adjectum," etc. Galen seems to distrust the use of it, and says that it "heats" and affects the urinary passages. But in his time asafœtida had become very rare, and the little that was sold was falsified. At that time, a stalk having by chance been discovered, it was presented to Nero. This may explain Galen's opinion. The Arabs, including Rhazes and Averrhoes, used it, and transmitted it to the monks of the school of Salerno, who gave it the name of asa (not assa) fœtida.

This gum-resin, the extremely bad odor of which prevents its use as often as might be desirable, is in India and Persia the necessary condiment of all dishes. With the agreeable impression which makes it sought, these people find combined a favorable effect upon digestion, which there

is naturally painful; it relieves the uncomfortable, sometimes dangerous flatulence which is produced by the vegetable diet and the abuse of opium which the climate and religion impose on them. The Brahmins use enormous quantities.

Asafœtida is used in all the cases in which we have said that valerian might be usefully employed; but the latter must be preferred on account of its less repulsive and permanent odor, and also because asafœtida often purges, which it may be desirable to avoid. We may add that asafœtida will succeed better in violent and developed attacks of hysteria, when the disease has rather the vaporous than the convulsive character, when it is accompanied by the incessant production of abdominal gases, and that obstinate constipation with colics which is peculiar to hysterical people. Whytt notes in these patients the excessive and debilitating evacuation of crude and pale urine, which he has cured with asafœtida, as well as the demoralization, so trying to a physician, into which hysterical women fall. Whytt, who knew nervous diseases so well, also advises it in hysterical syncope and faintness. Boerhaave positively affirms that he knows no better anti-hysteric remedy. Forestus, while sharing the singular ideas of Aretæus in regard to hysteria, says, nevertheless, that he has given asafœtida with great benefit at the height of the attack. "Quædam," he says, "solor odoratu asæ fœtidæ per os excitatæ sunt." It is for practitioners to distinguish the cases in which asafœtida must replace valerian in hysteria, but without forgetting that, in consequence of inexplicable vital conditions, the one may produce effects which might have been expected from the other: a general truth in therapeutics, but particularly applicable to diseases which, like the antispasmodics, have a superficial and not an alterative action.

There is another order of morbid symptoms, in the treatment of which we have repeatedly found our experience confirming that of the past; we refer to nervous diseases of the respiratory organs. And first, in essential asthma, that is, asthma not caused by appreciable organic lesions of the heart and lungs, asafœtida has often produced good and incontestable effects before our eyes. If this were the place, we might support this assertion by absolute proof.

In irritable men, and men in whom a commencing organic lesion of the heart gives rise to suffocative feelings, palpitations, and a general spasmodic state disproportioned to the degree of material change, enemata of asafœtida have their advantages. Clinical experience enables us to state that in catarrhal affections in which nervous symptoms play the leading part (as is quite common), equally good effects are obtained. If we may not hope for the complete cure of those suffocative catarrhs which in winter, merely by a sudden fall of the temperature, kill over night old men suffering from chronic bronchorrhœa, we may certainly lessen the danger and gain time for other remedies.

Millar is full of praise of the virtues of asafœtida in the disease which he calls acute asthma (stridulous angina, coryza of the glottis, Breton-

neau); he gives it always in those cases, unless the vomiting and diarrhœa are too violent. The following is his formula: Asafœtida, 8 grammes (ʒ ii.); spirit of Mindererus, 30 grammes (℥ i.); eau de Pouliot, 100 grammes (℥ iii.).

He says that children finally take this without objection, and even with pleasure. At the same time he gives an injection as follows: Asafœtida, 8 grammes (ʒ ii.); linseed tea, 100 grammes (℥ iii.); olive oil, 30 grammes (℥ i.).

We will not deny Millar's success, if he will permit us to say that acute asthma in children usually yields to all remedies, which is the same as saying that it gets well without them. But when he publishes similar results in cases of croup, and says that in an epidemic of croup not a single child that took asafœtida died, we postpone our assent until we find the assertions of the English author stamped with the single mark of authenticity, namely, a mention of false membranes, without which the word "croup" has no value.

Many authors, Kopp in particular, have praised asafœtida highly in whooping-cough. Its value in such cases is incontestable, unless it is destroyed by the difficulty of making children take it; for they dislike it too much in draughts and cannot retain it in clysters. We greatly recommend its use in the tussis ferina of nervous women, in which practitioners would certainly have found it much better than leeches to the trachea, which, not to speak of the indelible traces they leave, almost always increase the symptoms.

The flatulence of old men and hypochondriacs, and the obstinate constipation of the former, very often require enemata of asafœtida. A long experience has absolutely proved its value in such cases, and in the palpitations of chlorosis.

This is one of the remedies with which Hildebrand has succeeded best in the treatment of the last period of the nervous troubles of irregular typhus. As to its emmenagogue properties, we admit them as we do those of valerian.

In reading Cullen's "Materia Medica," we see all that is important that we have said of asafœtida, confirmed most formally by the opinion of this illustrious physician.

We omit the benefits which may be derived from the external use of asafœtida in caries, indolent tumors, etc., because in this respect we could be nothing but historians. The same is true of the anthelmintic action, praised by several authors, and in particular by Fred. Hoffmann. It is easy to see that we can neither ratify nor contradict the febrifuge virtues which Bergius has ascribed to this gum-resin in cases in which Peruvian bark failed. What remedy does not sometimes fail?

The same want of personal experience dictates the same reserve in regard to its antiarthritic and antisyphilitic powers. When practitioners, using asafœtida by the rules we have furnished, shall be satisfied of its value, they will appreciate at their true value the assertions, at most in-

significant, which certain authors have made in regard to antispasmodics, and to asafœtida in particular.

In résumé:

An antihysteric remedy, having the properties of valerian, more useful than that in nervous affections of the respiratory organs and the digestive system, whether essential or associated with other morbid states. It is important to add that asafœtida is quite heavy, that is, slow of digestion. There are some who have it "still on the stomach" the next day. This observation, which we have often made, will occasionally deprive the physician of the services asafœtida might have rendered, in the case of nervous persons, who are frequently dyspeptic. It should in this case be used as a clyster.

Asafœtida is used as a condiment for dyspeptic cattle. Inferior fodder, to which asafœtida has been added, is very well digested, and is even eaten by the creatures with greediness.

Ammoniac.

Known and used from the earliest antiquity, gum ammoniac, highly reputed in all cases where antispasmodics are of use, is especially valuable to practitioners by its expectorant, anticatarrhal, and antiasthmatic virtues. It has seemed to us particularly advantageous in essential moist asthma, the attacks of which end with abundant expectoration which seems to form the crisis. By hastening and facilitating this evacuation, ammoniac shortens the duration of the attacks, and even opposes their return by an influence which it possesses over nervous affections in common with antispasmodics.

In the chronic catarrhs which present nothing, or almost nothing, more than an exaggerated and morbid mucous secretion from the bronchi, we can attest, from experience, as in the cases of which we have spoken, the good effects of ammoniac. But let us be properly understood; and let no one, through an error in diagnosis, give ammoniac in diseases of the heart and tuberculous phthisis, where the asthma and expectoration are subordinate to grave and irremovable difficulties, and then cite cases against us, which lie outside of the legitimate sphere of action of ammoniac. Murray seems to have made such a mistake when he says, "Quin ipsis phthisicis opportunum, si puris ejectio non succedit."

If in the cases of asthma of which we have spoken, expectoration is prevented by the viscosity of the sputa, much advantage is gained by uniting gum ammoniac with an equal quantity of medical soap. The alkalinity of the latter makes the products to be expectorated fluid, and thus assists in stopping the attacks. It may be prescribed with benefit in suffocating catarrh, a very alarming affection, which one is glad to modify, even slightly, by any remedies.

As respects its special action upon the uterus (which has been so ex-

aggerated that Alibert, who denies it all properties, even that under which we have classed it, has felt obliged to include it among the emmenagogues), we refer the reader to what we said upon the subject under valerian and asafœtida.

Several practitioners of merit have found it valuable in inflammations of the chest, when expectoration is suppressed. "Si sputa in inflammationibus pectoris moram trahunt vel supprimuntur, pectus liberat." Combined with oxymel of squills, it has been also praised by them in all atonic affections of the respiratory organs.

We are surprised to find both Cullen and Murray attributing to ammoniac objectionable qualities which have never been attributed to it by those who knew the proper object for its use. Has the illustrious nosologist fallen into the error which we just noted?

In brief—there are incontestable (if not uniform) advantages in attacks of moist asthma, or in that which is now called, very incorrectly, chronic capillary catarrh with emphysema.

Our experimental evidence is insufficient to authorize us to give any opinion whatever upon the value of ammoniac in leucorrhœa and the organic diseases, usually incurable, which were formerly known by the name of "visceral obstructions."

As dispersives and resolvents in cold engorgements of the limbs, glands, and joints, much has been made of certain plasters made with gum ammoniac softened with wine or vinegar.

The substance is chiefly prescribed in pills or emulsions. We also frequently give it in small masses as it comes from the shops. It is then given in the dose of from ·75 to 2 or 4 grammes (gr. 12—30—60) per diem. Physicians add it, according to their wish, to a multitude of magistral preparations which we need not mention. (See in Jourdon's "Pharmacopie Universelle" the astonishing quantity of formulæ of all sorts containing ammoniac).

Musk.

The Greek and Arabian physicians do not seem to have known musk. It is everywhere stated that Ætius was the first to mention it. We are ready to believe this, for it is of no consequence; but we have not been able to find a trace of the drug in this author's fine and important work. At the beginning of the sixteenth century, Salomon Albectus praised musk, but in such pompous terms that one is led at once to mistrust him. A specimen is found in his exordium: "Zibetho vero longe præstabilior (Moschus), ita me hercule necessarius, ut si usura ejus medicinam orbaveris, ipsa protinus mutila sit ac deminuta." By the side of very curious fables and hypotheses upon the natural history of this substance there are found some therapeutic details which are interesting, and add their testimony to the general belief as to the powers of this drug.

Hysteria.—The value of musk was first tested in hysteria and its at-

tendant train. "Utero imprimis, qui omni tempore spasmis enormibus subjecta, pergratum." We may look in the works of Platearius, Zacutus, and Amatus Lusitanus, for the miracles performed by musk. The observations of Lud. Mercatus are less conclusive. They refer to organic lesions, prolapse of the womb; and it required the fanatic faith of these observers in the theories which they had received from the Greek physicians in order to believe that the smell of musk caused an actually displaced womb to resume its place behind the pubes. But they had all noticed that which is even now seen, to wit, that musk causes hysterical spasms in certain nervous women: "Ab ejusdem odore naribus hausto, fœminas ut plurimum in suffocationem hystericam incidere;" an important circumstance, which makes the remedy very hard to use, for it is impossible to know beforehand which women will be thrown by it into spasms, and which it will relieve from them. "Quibusdam mulieribus uteri provocationem adfert, aliis contra hanc mire prodest." Junker had observed all this, and has no difficulty in classing it among the occasional causes of hysteria.

The authors whom we quoted above used it in plasters to the hypogastrium and the upper part of the thighs, while they placed the most fetid smells near the upper part of the body. By the former of these devices they drew or retained in its place the womb, attracted by the perfume of musk, and by the latter they forced it, by the dislike it felt for the bad odors, to quit the throat and chest; the ascent to which, in their opinion, constituted the whole of hysteria. "Utero enim valde gratus; quare emplastrum ex moscho ad retinendam uterum furentem umbilico imponere. Quæ dum fiunt, grave olentia simul naribus admovere," etc. It is astonishing that the celebrated Rivière professed the same belief, and recommended musk for the same purpose.

Of all the facts which tend to show the value of musk in hysteria, none seem more convincing than those reported by P. Forestus in his chapter "De mulierum morbis." I say that they are conclusive because his diagnosis is most precise. The effect is so prompt, so complete, so unexpected, that doubt is impossible unless we pay great attention to a little fact which we will state after reporting Foresti's marvellous observations.

First comes the case of a young girl in whom hysteria is plainly seen by the following traits: "Audiebat quidem, sed non poterat loqui, et licet non loqueretur, subinde plorabat, rursus ridebat," etc. Let us, by the way, point out in the following passage the germ of the theory—or rather, the theory in perfection—of hysteria, as given by Forestus, which does not at all lessen the merits of Dubois of Amiens, who reproduced and developed it in the most satisfactory way: "Videbatur (puella) laborare ex tetro vapore sursum (ex utero) elato per spinæ membranas et nervos ad cerebrum." The most heroic remedies had proved in vain, and it was impossible to tell what to do next, "pro deplorata habebatur;" finally Forestus says, "coacti fuimus suadere ut aliqua mulier digito in hoc liquore immerso (a mixture of musk) vulvam intus confricaret," etc. The attack

was almost instantly quieted. A second case is also that of a young girl very subject to hysteria. Forestus was called after the attack had lasted some time: "Adeo violenta, ut pro semimortua habebatur; anhelitum trahere non poterat, frigidum exsudabat, totumque corpus quasi convellebatur, utero ad superiora retracto." Forestus employed the remedy which had succeeded so well before: "Vix digito imposito in vulvam cum confricatione, ad miraculum ad se rediit, et ab orci faucibus quasi erepta sit."

These cases are less demonstrative than they might seem. In fact, the treatment of Forestus is very complex. It is composed of musk; but more than that (but Forestus did not distinguish it), of the introduction of the finger into the vulva; and this introduction was also complex, for it was performed "cum confricatione." This latter operation is of itself very likely, as we shall see, to arouse an hysterical person.

In the hysterical passion the cerebral functions of the eye are not abolished; they are only subdued by the empire of the uterus, which holds under its influence the centres of locomotor innervation; and this explains the irregularity of the muscular movements which are usually under the control of the will. But let a powerful sensation of joy, of pain, of fright, surprise, etc., come to warn the woman that a danger threatens the system, or appeal to powerful instincts, and at once the will and its organs will resume their rights, and this triumph of the intellectual life immediately puts an end to the attack. If any one will philosophically attend to the symptoms of hysteria, and follow their order scrupulously, he will accept this theory, which was clearly seen by the physicians of the seventeenth and eighteenth centuries. Is it doubted that the singular proceeding of Forestus is capable of producing in a young girl the reaction of which we speak, a reaction necessarily united with a feeling of irresistible shame, aggravated by surprise?

How did Forestus fail to explain the power of this influence on hysterical persons, while in other observations he reports that women were cured of their attacks in the same way *without the aid of musk*, and by plucking out the hairs of the pubes, a procedure which he justly stigmatizes as more than improper? The facts of Forestus, so often invoked by those who praise musk, are, then, without the slightest value.

It may be said (and it seems to be proved) that a tampon of charpie dipped in laudanum and placed upon the cervix uteri at the height of an hysterical attack quite often arrests it. We do not deny this; but though the treatment is reasonable, it may be open to the same exceptions as those we have just addressed to Forestus.

We may be pardoned this long discussion and the quotations, in view of the importance of the subject, and especially because, having no personal experience of the effects of musk in hysteria, we desired to supply our deficiencies from the knowledge of others.

We should deeply regret it if any physician could so far forget himself as to abuse the revelation we have just made of the procedure of Forestus

in hysterias and venture to apply it. We are not writing a treatise upon morals; but we may be allowed on suitable occasions to recall the laws which are superior to every other interest.

Typhus.—The powers of musk have been equally boasted of in this affection, without much more ground. Marcus, a German physician, an old sectary of Brown's, converted to organicism by reading Bichat, and who anticipated the author of "Les phlegmasies chroniques" in the idea of regarding fever as always the result of inflammation, has used a good deal of musk in typhus, and has published a work in which his theories seem to be supported by many observations.

He considers typhus as an encephalitis; but what does he understand by encephalitis? All the cases of cure he reports came to an end (and this is remarkable) on the seventh, fourteenth, or twenty-first day by critical evacuations. In some cases, often the twenty-first day, there was an intermittent fever, which always yielded to quinia. The course of the disease was that of a dothinenteritis bearing the inflammatory and nervous form, as is seen so often. The patients were seized with intense chills, hot, acute fever; to this were soon added symptoms of delirium or coma, intense cephalalgia, great stupor; in a word, all the group of typhoid symptoms. Bleeding was commonly used at the outset; next, antispasmodics, at the head of which stood musk. If the disease was a benign dothinenteritis (synocha simplex), and musk was given on the fifth or sixth day, the crisis occurred on the seventh and the credit was given to musk. If at the end of the first day there was nothing but the remission common to dothinenteritis, which runs for two or three weeks, this remission was still regarded as an effect of the treatment. We will say the same of the termination at the fourteenth and twenty-first days, which occurred as they ought to occur, according to the laws which regulate the progress of the disease in spite of all medicine.

Death occurred twice on the eleventh day, in spite of musk, the remission at the seventh day not having appeared; once on the twenty-second, once at the end of a month, in spite of musk, and simply because some cases of the disease cannot recover. In the cases where the period and manner of death contradict the diagnosis of Marcus, the abdomen was not once opened; the brain only was attended to, and was always found "congested." This was the encephalitis.

The work contains but a single case of idiopathic affection of the brain; but, as we know, this is not a typhus. The case was that of a man aged sixty-one, who, after a blow from a mug upon the head, had an ambulant erysipelas, which killed him, and the autopsy showed a phlegmasia of the meninges which was not more docile to musk than the dothinenteritis had been, with which he confounded it. His work, therefore, proves nothing either for or against the efficacy of musk; it only serves wonderfully to strengthen our ideas of the nature of severe continued fevers, which are no more an encephalitis than they are a gastro-enteritis, a hepatitis or a splenitis, but a disease, the nature of which need not be

discussed here, and which the physician can no more throttle than he can a small-pox or any grave exanthema.

The observations of Mertens, who used musk in the plague of Moscow, and the epidemic catarrhal fever which preceded it, are more conclusive than those of Marcus; but Mertens was an observer of the great Hippocratic school, a rival of the illustrious Stoll; he did not profess to cut short in the middle a severe fever, but simply proposed to combat with musk the nervous accidents which so greatly hinder the progress of typhoid affections. We will say the same of the two Francks.

About eighty years ago Michel Sarcone succeeded, by the use of the same remedy, in checking the delirium and a fatal excitability which appeared in some cases of the terrible epidemic of Naples, of which he has given an account which in several ways is so remarkable.

"When delirium was threatened," says he (t. II., p. 240), "and there appeared a manifest sensibility, with which was associated its omnia and an extreme disturbance of the affections, the only remedies which were suitable were those which could introduce into the system the principle of calm and repose. In this case too much praise cannot be given to the advantage which our patients derived from the use of gentle sedatives and narcotics prudently administered.

"Among those remedies the chief was musk, which was most efficient in soothing and restraining the principle of convulsive sensibility which reigned in a very marked degree in some cases. These fell at first into a pleasant and unexpected confusion of mind, which passed by degrees to rest and sleep; the pulse acquired a certain regular undulation; the breathing became less sighing. If it sometimes happened that delirium could not be avoided, it certainly was not so violent as the activity of the combined symptoms threatened, nor did it ever reach those dangerous extremities which it attained in those to whom the drug (by I know not what misunderstanding of prejudice) was given too late."

Pneumonia.—We are upon a much more important point, where we may be allowed to speak for ourselves; we mean the use of musk in certain pneumonias with delirium, those which were formerly called ataxic or malignant. The first facts of the kind are due to Récamier.

One who grasps these facts, sees that antispasmodics in general are indicated; and musk has more especially succeeded. But this point is of serious importance.

The most decisive observation made by the skilful practitioner whom we have just named is chiefly remarkable for an appearance of a plethoric and inflammatory diathesis which is rebellious to bloodletting, which are carried as far as possible without producing the least moderation in the symptoms. The latter seemed to be rather exasperated by the remedies which usually reduce them. Delirium supervened with signs of adynamia and nervous incoherence; musk was given, and in two days the patient (a woman two months pregnant) was quite out of danger.

Another case is that of an old man who was suddenly taken with a

violent pneumonia. He seemed at first to bear well the letting of blood; but suddenly he fell into an extraordinary collapse, with delirium and ataxia. Musk was first given without success; a few spoonfuls of coffee were then administered, which excited the system a little, and after which musk found its opportunity, and the patient, who seemed destined to sudden death, recovered quickly.

In these two cases the local symptoms of pneumonia remained several weeks after the general symptoms, which alone imparted gravity to the case, had been cured.

These observations are confirmed by three others, equally conclusive, published in the "Bibliothèque médicale" (1848) by Jacquet, under the patronage of Récamier. They leave nothing to desire in regard to precision of diagnosis, the special relations of the general symptoms to antispasmodic treatment, and the immediate and incontestable success of the treatment.

We can add several more to the list of cases of ataxic pneumonia treated successfully by musk. The first is that of a man who was attacked with very acute pneumonia while intoxicated. He was bled several times before coming to the Hôtel-Dieu; was delirious on entrance, although the gravity of the nervous symptoms was insufficiently explained by the intensity of the local lesion. Antimonials had no effect, and all the pupils thought the case fatal. Musk was ordered, and convalescence began on the next day. Some time later we had occasion to use it for a young girl affected with a pleuro-pneumonia of moderate intensity, as regards the pulmonary lesion; the nervous susceptibility which she exhibited on entering the hospital increased under the influence of antiphlogistics and antimonials, and then changed to a violent and ataxic delirium which was quickly subdued by musk. We will quote only these two cases from our own practice, though we have often used musk with success in these conditions.

We know that Professor Chomel has appealed to clinical experience to refute these results; but we must not forget the wise principle which he used to instil into his pupils, that a therapeutic result has no scientific value except such as is conferred by an exact knowledge of the nature of the disease. Nor have we to do with a diagnosis which requires the use of stethoscope and plessimeter; and the results of these instruments are of little value unless checked by that of the constitutional state of the subject.

It is important to note that the delirium which, in pneumonia, yields to musk, is not invariably a symptom of a malignant condition and an insidious fatal tendency. In some cases of pneumonia there is a purely nervous delirium, as it were maniacal, or a sort of frenzy, independently of that fatal incoherence and ataxia which we spoke of. The brain is violently excited, the patients are agitated, wish to rise, talk nonsense with furious vivacity, exactly as if they were in the expansive and reactive stage of alcoholic intoxication. This kind of deliriousness, of trans-

port au cerveau, of hot fever (as they say), sometimes occurs in pneumonia in drunkards. The vital resistance does not give way; we cannot say that there is ataxia, and yet bleeding does not relieve this cerebral exaltation and delirious insomnia. Musk, on the contrary, succeeds well. Opium, not cinchona, should be associated with it; opium alone is also powerful. These cases are not always destitute of gravity.

Sarcone observed this: "Opium given with skill and moderation tended to the same end. Yet I must admit that, though I kept to it during the first weeks of the epidemic, nevertheless, as I had observed that it was sometimes extremely hard to prescribe exact and suitable doses, capable of acting only to the point desired, and not beyond, and also exactly suited to the degree of need, I abandoned it toward the end of April and confined myself absolutely to the use of musk, which I found more and more sure, and not less efficient.

"I think it necessary to say that in this species of delirium, which was the product of an excess of sensibility, far from regarding with suspicion a remedy which in its power of producing sleep, seems to include that of filling the organs of the head with blood, I can give assurance that, on the contrary, it was the only remedy which was able to produce sleep in this class of disturbance. It is for this reason that we were obliged to combine opium with musk, especially when to the excess of sensibility there was added fatiguing and obstinate loss of sleep."

It follows from these facts and the discussion which they occasioned, that certain pneumonias, the progress of which seems blocked by a grave nervous condition, are resolved if, after the indication for bleeding is sufficiently obeyed, the obstacle can be removed by the remedy which has an electric relation to the patient's condition. This remedy in this case is musk, and it must be used in accordance with rule.

One gramme and more per day may be prescribed, in "doses filées," as Récamier says, that is, by dividing the whole into five pills, one of which is given every hour, and continuing until a remission of the symptoms occurs, which usually occurs in eight or ten hours at most, after which (says Récamier) we can no longer count on the effects of the remedy, which are speedy or null. This profound observer has succeeded in other phlegmasias than pneumonia, in case of the same ataxic complication; this need not surprise us, for musk has no special action on the inflamed lungs.

We will not amuse ourselves with discussing what has been said of the value of musk in epilepsy, for we disbelieve in it, in spite of the authority of Haller, Van Swieten, and Tissot. The case inserted in the *Transactions Philosophiques*, and so often quoted to prove the virtue of musk in hydrophobia, signifies only that the disease resists all remedies. It has been said to be used in tetanus with success. Warner, and Solomon Albertus, are never tired of telling its properties in spasm, whooping-cough, hiccough, dysphagia, and all the nervous diseases. In the

"Mémoires de l'Institut de Cologne," we read the account of certain facts which seem to confirm these claims.

The old "Bibliothèque medicale" contains a very curious case of the successful use of musk in a disease composed of apoplectiform attacks with hemiplegia of the right side, which passed off but soon returned, and seemed about to cause the patient's death. Alibert quotes a case of success in a fever, the symptoms of which, as he says, were nervous. "I affirm that musk is one of the most potent antispasmodics that are known to us," says Cullen. We wish that we had been able to give musk in the cases which the famous nosologist specifies. It is impossible to refuse all belief in them; they are cases of misplaced gout, fixed in an important viscus, and Cullen, an admirable judge of this disease, speaks very favorably of musk. It is in circumstances like these that Pringle found it very efficacious. Cabanis, who was persuaded of it, gave it in large doses to Mirabeau, who seemed to succumb to an affection of this nature transferred to the diaphragm and pericardium.

We should never make an end, if we quoted all that has been said of musk. We will add but one thing, namely, that owing to its frightful expensiveness and the astonishing persistency of its disagreeable odor, which to many persons is very objectionable, it must be used as little as possible, and reserved for cases where known agents of analogous powers fail, especially those cases of pneumonia of which we spoke, and those of misplaced gout, as Cullen says. Its aphrodisiac effects might perhaps be made useful.

In some, musk seems to us to be chiefly indicated in the grave nervous symptoms which complicate and are associated with other diseases. These diseases are almost all inflammatory, and the nervous symptoms which may complicate them and which we regard as calling for the use of musk, almost always affect the cerebral functions, and consist chiefly of sub-delirium, coma vigil, and those muscular and fibrillary palpitations which occasion subsultus, agitation of the muscles of the face, an uncertain and surprised look; all quite out of proportion to the local and febrile inflammatory accidents, and essentially disconnected with general infection.

Castoreum.

Galen, Celsus and Aretæus used castoreum in cases like those in which its action is now least contested. Pliny and Alexander of Tralles also speak of it. The former refuted the accredited errors of his time in respect to the mode of origin of the substance, but he believed in several. Dioscorides, in a very few words, indicated all the important cases in which the remedy is at present well accredited. His commentator, Mattioli, leaves little to be desired in regard to the anatomy of the castor and the most prominent properties of the substance secreted by this rodent. But the therapeutic indications which it can fulfil are the most carefully specified in Ætius, together with cases in which it is contraindicated.

If we consult less ancient authors, we shall find them adopting the most contradictory views of the action of castoreum, but we will spare our readers the details of pure critical erudition to which this examination might lead. The important part is as follows: When used in any of the spasmodic nervous affections which we have several times specified in the preceding articles, castoreum has been distinctly useful; and in all cases its action has seemed more like that of valerian and asafœtida, than that of musk. Its slightly excitant properties in therapeutic doses have made it sometimes injurious in cases where the state of the circulatory system would seem to contraindicate its use. The enthusiasm of certain authors, who, like Krausolot, have delighted to recite the list of almost all known diseases in order to cure or relieve them with castoreum; or like Ettmüller, who calls it the "anchora sacra" in all nervous affections, especially hysteria and hypochondria; like Schulz, Hilscher, Tilemann, who in their special works on this substance have proclaimed it the most potent of antispasmodics—this enthusiasm deserves the same blame as the absolute defamation with which Stahl, Junker, and Rivin visited it, and in our days Ratier, who, in order to be consistent, included castoreum in the prescription which he decreed against all antispasmodics. From Dioscorides to the present time, there is no equivocal fact which has passed without question through this medley of contradictory opinions, which prove much less against castoreum than against the inattention and bad faith of observers; this is the value of this agent in certain cases of amenorrhœa and colic.

We have seen this indication fulfilled by castoreum, chiefly in amenorrhœa accompanied by painful tympanitic swelling of the belly. They are cases in which the congested womb lets escape only a few drops of blood with pain, with a sort of uterine tenesmus. Our experience is confirmatory of that of our predecessors, who never spoke well of castoreum in amenorrhœa without specifying the class. Dioscorides says, "It provokes the flowers in women and is good in colics and cutting pains of the bowels;" which the learned commentator Mattioli confirms by his own experience. Ætius expresses himself as follows: "Ad suppressos menses ob copiam aut crassitiem sanguinis." Ettmüller is not more precise, though more explicit: "Pro usu ciendi suppressos cum difficultate et variis abdominis pathematis fluentes."

We might summon many more witnesses. The colics which it seems to suit are chiefly those called nervous, and which seem to be seated in the small intestine. They are accompanied by pallor, cold sweats, sudden loss of strength as if from something which attacks the seat of life. The colics are without discharges, come suddenly after acute emotions, chill of the abdomen or feet, as when a person has been long exposed to a cold rain; they compose one of the varieties of the iliac passion, of the colic called by some authors *miserere*. It would take too long to quote all the points of indication given by ancient authors, and the observations with which they support them. Let it suffice that they are unanimous, and that

they cannot be accused of copying one another, as most of them are only observations in their own practice. Bricheteau relies much on this substance in hepatic colic, symptomatic of biliary calculus. Castoreum has also had a universal reputation for aiding the pains of labor, calming the severity of the griping, and expelling the placenta when retained by painful spasm of the uterus; all of which corroborates what we said of the remedy in certain amenorrhœas. This reputation of aiding accouchement, and the expulsion of the placenta has been retained in the north, where castoreum is popularly used for the purpose.

Iraceum has been proposed to take the place of castoreum, and seems to have the same properties; it is the dried urine of the Hirox capensis mixed with the creature's fæces—a black, solid, viscous, very odorous mass, which is little known.

Camphor.

We have made very little use of camphor; not that we were alarmed at the title of incendiary which was given it by the physiological school; but the dissensions of authors, and the uncertainty of its effects, have led us to distrust too much this doubtless useful agent. We shall, however, pass in review the different cases in which it is said to have been given successfully, state and discuss the indications and contraindications.

Phlegmasiæ.—Let us first take two great orders of disease, in which camphor has been praised by the greatest number, and dispraised by a few. These are the fevers and inflammations. "Quare in febribus continuis quæ fere omnes aliquid inflammatorii habent, itemque etiam in inflammationum generibus cæteris, in pleuritide, phrenitide, angina, inflammatione uteri, magno cum fructu semper camphora cum nitro mixtu in artis exercitio usus sum." The speaker is Hoffmann.

These assertions are confirmed by too large a number of celebrated men to fail of securing belief, at least as regards the innocence of camphor in the case in question. L.-B. Tralles affirms that he knows no agent in the whole Materia Medica which is more potent in inflammations. Are there many drugs, or in general many means of arresting the course of this organic state called inflammation, when well established, "quum firmiter hæreat" as the old physicians said? This is not the question. It is only necessary to know if, in inflammatory fevers, with or without phlegmasia, camphor can help in quieting the violence of the febrile reaction, etc. In small doses, we think so; but do not recommend it except in acute and frank inflammatory fevers. We strongly dissuade practitioners from it, because it risks the increase of accidents of general and local irritation for the sake of a questionable sedation.

Nothing better proves the inconstancy of the effects of camphor than the contradictory observations reported by several authors. Junker, remarking that it is useful in certain inflammations, but harmful in others, makes subtile efforts to specify the conditions of this difference: "In iis

calorem auget, in aliis præter naturam auctum minuit." He ends by recommending its use in all phlegmasias, after a bleeding. In his great work on general therapeutics, he places less restriction on its use than in his inaugural thesis. Nephritis is, according to him, the phlegmasia which especially demands the use of it, owing to the diuretic power and the sedative action upon the urinary passages. The angina which follows continued fevers is also cited by Junker as suitably treated by camphor. It is well to add that in general he scarcely gave it except at the beginning of inflammations, "si adhuc recens est malum."

The illustrious Werlhof filled the "Commercium Nurembergense" with accounts of acute phlegmasias cured by camphor. He especially quotes many pleurisies of much intensity of local pain and general symptoms, in which these symptoms were relieved so shortly after the ingestion of camphor that the action of the remedy may claim a part in the effect. Pneumonia and puerperal metritis have seemed to be improved also. No accidents, he says, have ever followed the treatment. "Sancte testor nullum plane inde caloris incrementum, sed potius placidiora omnia," etc. A celebrated physician of the time, Bergerus, repeated Werlhof's experiments, and had prodigious success; he wrote to the latter that he hoped soon to bring all physicians to use this good method; in the letter we read: "Ipse illud præcipue in pleuritide aliisque internis inflammationibus majori etiam dosi quam quæ abs te commendatur sæpissime felicissime que usurpo."

Joerdens, encouraged by these examples, gave camphor in pleurisies and obtained prompt and complete effects. Alberti praises it in the same cases, but advises that it be not given, except at the beginning of inflammations. At that period, he says, there is no remedy more evidently efficacious; but if we wait longer this is not the case. They are unanimous in this recommendation. When Werlhof, Bergerus and Joerdens speak of pleurisy, it is very probable that they mean nothing more than the stitch in the side, frequency and difficulty of breathing, febrile symptoms, etc., without regard to effusion; but we know that the natural order of the disease is such that the group of symptoms which in their eyes constitutes the disease ceases to exist in a few days, without the pleurisy being cured. The effusion remains, and we do not think that camphor has any control over it. It is also very possible that these physicians had only pleurodynia to treat—a rheumatic trouble which is well suited by calmatives and diuretics such as camphor. Mertens insists that the pulse should be hard, nervous, and that there be no sign of coction or crisis, if it be given in inflammatory febrile disease. Large doses of camphor are, according to Ponteau, one of the most heroic remedies for erysipelatous affections of the lower bowels in puerperal fevers.

Unless there are special rare indications, we must not let ourselves be deluded by these marvellous promises.

Rheumatism and Gout.—In gout, and more especially in acute and chronic rheumatism, camphor has obtained many good opinions down to

our own time; thus Collin reports a great number of chronic rheumatisms, and still more of sciatic neuralgias, in which much good was done by large doses of camphor. Werlhof (op. cit.) gives a case of misplaced gout in the viscera, in which large doses of camphor seem to have been very efficacious. Analogous cases are common in the authors of the eighteenth century. In speaking of musk, we have mentioned these cases, and observed how happily they seem to yield to strong doses of the remedies called diffusible stimulants.

Since the beginning of this century several theses and memoirs have appeared, which assign to camphor a great curative power in acute febrile rheumatism. But the observations on which the authors have based their conclusions are less convincing than they think. Thus, for instance, the thesis of Chèse (Paris, 1808) proves absolutely nothing of that which the title announces; we see many sciatic neuralgias in which camphor in friction or fumigation seems to have succeeded well, but these affections, though often rheumatic, as respects their cause, are not acute febrile rheumatism.

Delormel (*Journ. gén. de méd.*, t. CVII. gives several cases of chronic rheumatism and of gout completely cured by the vapor of camphor disengaged in a stove for five or six minutes, the patient being previously exposed for a quarter of an hour to the action of dry heat. To these fumigations pills of aconite and opium are added. The observations of chronic rheumatism consecutive to acute rheumatism seem to us quite conclusive. The latter, which evidently belong to gouty engorgements, do not deserve the same confidence, at least as a radical cure. The articular swelling and its inconveniences were destroyed, but we need not conclude with the author of the memoir that he cured gout; for to resolve a gouty engorgement is no more curing the gout, than excising a syphilitic excrescence is curing syphilis. We could wish, in order to pass a more assured opinion upon these observations, that the treatment had been separated from aconite and opium, which have a known efficacy in these complaints. Cullen was so persuaded of the refractory nature of gout, that, while admitting that camphor might dissipate a local manifestation of the gouty principle, he preferred not to use it in cases in which the gouty eruption, having fixed itself upon a part not vital, as the limbs, a metastasis to the viscera might be dreaded; he reserved it for cases of the latter sort, to deliver the viscus at the cost of a return of gout to less essential organs.

According to Dupasquier, a long extract from whose paper is found in the *Revue médicale*, 1826, t. II., p. 218, acute febrile articular rheumatism finds its specific in camphor, used by fumigation. Let us inquire whether, like Van Helmont, Dupasquier, has not gone too far when he declares those unworthy of practising the healing art who cannot cut off a disease in its beginning.

Among this physician's observations, two, well characterized as general febrile rheumatism, are included as cases of cure. The remission of symp-

toms took place, in the first, at the end of *three weeks*, and a relapse followed a week later, which was regarded as a new case of rheumatism. The subject of the second case was cured in a fortnight; the weather was wintry; in a week longer there was a relapse which required to arrest it three or four fumigations, and was also regarded as a new attack.

The first error here is, to consider a therapeutic agent as efficacious in rheumatism when the latter does not yield until three or four weeks; for this is the mean direction of the disease as left to itself. The second error consists in reckoning as a new invasion the relapse of articular pain after a week of intermission. How often have we seen all pain and swelling disappear, while, the rheumatismal fever remaining to attest the existence of the cause, we predicted a speedy return to some new locality, synovial membrane, endocardium, or pericardium! These cases prove nothing for or against camphor. Other cases, of vague, non-febrile muscular rheumatism, are without value here. This class has no fixed duration, and usually goes away of itself. He gives only two cases of cure of really acute and febrile articular rheumatism in five days; in one of them no mention is made of fluctuation of the joints. But who has not seen, without being able to account for the fact, rheumatisms which so resembled the most refractory forms as to threaten to last four or five weeks, and yet disappeared in a few days with trifling treatment or none at all? So true is it, that diagnosis, taken in its full value, and the knowledge of the natural course of disease, is the most important of medical studies!

Dupasquier thinks that camphor acts by producing a powerful revulsion to the skin. But rheumatism itself is a long revulsion to the skin, which is burning, injected, covered with a profuse, non-critical sweat, more harmful than refreshing; and it is by sweating that the unhappy wretches, whose greatest distress is from sweating too much, are to be cured! Apart from these considerations, all which excites the skin and provokes diaphoresis—as lukewarm baths, baths with vapor of water and aromatics—always seemed to us more harmful than useful in acute rheumatism.

Typhus; adynamia in fevers.—Nothing equals the praise which is showered upon camphor in the plague, putrid, petechial and malignant fevers, and in inflammations of the same sort—"omnes morbi mali moris." The authors of the last two centuries attributed its virtues in the plague to the supposed rapidity of its diffusion, to its power of carrying off all the miasms which infect the system, by evaporating from the skin, and also to its direct anti-putrid action. Pringle, who tested its disinfectant properties, used it successfully in typhus nosocomialis, and in camp-fever at its second and third stage. Fred. Hoffmann informs us that, after a destructive epidemic of the plague, Verona raised a statue to a physician called Heinisius, for the services he had rendered in that epidemic with an oil which bore his name, and of which camphor formed the base. Camphor was also used lavishly in the plague of Marseilles. With the thera-

peutical fanaticism which is generally his characteristic, Ettmüller says: "Remedium in febribus malignis sine camphora est instar militis sine gladio." According to L.-B. Tralles, thanks to camphor, the plague will cease to scourge the world: "Non tot gibbosa cœmiteria reddit pestis emortuale virus." Mindererus, Rivière, Fernel, Schultz, Hartmann, Wepfer, speak with equal enthusiasm of the services it has rendered in malignant fevers; they report from their own observation a great many cases, which to them seem very peremptory, and which we will refrain from analyzing.

There is also Callisen's account ("Acta societatis regiæ tranniensis," t. I., p. 407) of a ship-typhus, in which, after all kinds of remedies had been vainly tried, he at last used with success the "antiseptic and sedative virtue of camphor." The remedy did not shorten the duration of the disease, as we may learn by reading the report of Callisen, for the typhus he describes is very probably a grave epidemic dothinenteritis; but by its sedative action it very manifestly suppressed many exaggerated symptoms, and led to a successful issue. In our times, when, after long debates and severe researches, we have been led to include in one sole class (typhoid, grave continuous fevers, dothinenteritis) all the fevers formerly designated as very distinct under the names of malignant, putrid, adynamic, nervous, pestilential fevers, we know how much reserve should be held in pronouncing upon the good or bad effects of any sort of treatment in these sorts of disease. At the uttermost, some remedies may be used to remove the obstacles to the tendencies of nature, and to free the progress of the complications which block it, such as parenchymatous inflammations, non-critical hæmorrhages, and nervous symptoms. We will not, then, disdain the facts which speak in favor of camphor. Perhaps, at the close of the disease, when the accidents supervene which are called putrid and nervous, as eschars, subcutaneous hæmorrhages, subsultus tendinum, coma, etc., this agent is not without value.

There is a particular fever which Rivière has described under the name of petechial, and which we will not affirm to be a dothinenteritis. Was camphor as useful as Hoffmann says? This is very uncertain, for the remedy was given about the middle of the second week, and Rivière says that the patient began to recover in a few days. This is much like the natural course of that class of affection. It is, however, right to say that, in his observations and in those reported by Huxham, which are very like them, the threatening accidents which were the cause or effect of the petechiæ improved rapidly under the influence of camphor. This enters into the question of complications, which, as we also think, should be met as we direct above.

Huxham fulfilled two indications by giving camphor in slow, nervous and petechial fevers. First, he excited diaphoresis without lighting up fever, while to this advantage he joined that of appeasing the erethism and producing sleep in cases where opium did not act.

Variolæ.—Camphor has had a great reputation in eruptive fevers of

malignant and putrid character, especially when the exanthema has been suppressed, and symptoms have followed which endanger life. It was prescribed in such cases as an alexipharmic, antiseptic, and sudorific.

Haller described an epidemic of small-pox at Berne in 1735, the severity of which was probably due to black spots, subcutaneous hæmorrhages which appeared between the pustules. We know that Sydenham regarded these spots and the bloody urine as certain signs of near death: "Sanguinis mictum et maculas purpureas quæ ita certe mortem prænunciant." Haller objects to this absolute prognosis. The cases which he gives are apparently in the same general condition as those of Sydenham. The mortality was general; all remedies failed; at last he discovered a means of salvation in camphor: "id vero fuit camphora." From the moment that he gave this remedy (1 gramme daily in a draught), he ceased to see the hæmorrhagic spots and the terrible symptoms which accompanied it; and if, by the imprudence of the attendants, he took cardiac remedies and a few spots appeared, the camphor-draught immediately brought the disease back to its benignant course. The draught was given until desiccation occurred. We have never had occasion to fulfil the indication in which Haller made such happy use of camphor. We would not hesitate to do it if it presented itself. Sydenham's opinion would allow us to try anything in such a case. His prognostics of variolæ have rarely deceived us.

The authority of Tissot would weigh much with us. Like Haller, he used camphor in the cases specified. It is true that he added acids, the action of which in such cases is unquestionable. Must we suppose that camphor may, as Rosenstein says, *enervate* the variolous virus and realize the preconceived opinion of Boerhaave on the possibility of quelling this principle? Must we believe that, if the latter is inoculated with the solution of camphor, the variolous infection is checked? These experiments have no title to our confidence.

Need we say that camphor has been lauded as sovereign in intermittent fevers? Have not all the agents of the materia medica been in turn invested with this power? In treating of antispasmodics, we will note the cases in which these various means will satisfy particular indications by combating pathological elements which are independent of the periodic disease. Its sedative action upon the circulation led Hoffmann to vaunt it in particular for hæmorrhages. Collin seems to have been the one who made the most use of camphor. He carries it to enormous doses. The important collection of observations which he published in the "Annus medicus," under the title of "Camphoræ vires," is largely made up of facts relating to foul, obstinate ulcers, spontaneous gangrene, phlegmasiæ of low character, abscesses, endless suppurations following small-pox, and especially scarlatina, putrid fevers, purulent hectics symptomatic of caries, etc. In all cases there exists a state of infection of the system, the cessation of which under the influence of camphor always precedes the improvement in the local state. There are also some examples of leucorrhœa and hysteria advantageously modified by camphor. Collin's facts are of a sort

which we think ought to give to camphor the most supporters. It is in similar cases that we have the least fear of it.

Dysuria.—The diseases of the urinary organs, including those which are accompanied by dysuria and strangury, are quite certainly relieved of these symptoms by the internal use of camphor. It is especially used in blenorrhagia complicated with difficulty and pain in urinating. Several recent papers testify to its efficacy in such cases. Cases of retention of urine are quoted, in which camphor given internally has saved the necessity of catheterization. The ancients and the moderns are agreed upon this point. Junker, nevertheless, denies to camphor this mode of action, and so does Cullen, who says that he has been led to think thus by numerous facts. This way of using camphor will be examined at the close of the article, under the head of combinations of camphor as a corrective of various agents.

L.-B. Tralles and Fred. Hoffmann, who have exaggerated the virtues of camphor to a ridiculous point, praise it as an excellent antisyphilitic. No one, we suppose, will be tempted to try it.

Neuroses.—We might enumerate all the disorders of this class, but our readers would gain nothing by it. We will say that it has been excessively praised, and sometimes blamed in all the neuroses conceivable, especially in hysteria, asthma, and flatulent disorders; among neuralgias, those of the face and teeth. We will speak of only two series of facts, those relating to the treatment of mania by camphor, and its anaphrodisiac property.

The reputation of camphor as a specific in melancholia and mania with or without delirium, which was almost universally possessed by camphor, was due to the former imperfect knowledge of mental diseases, the confusion in diagnosis, the absence of established distinctions between the genera and the species of insanity, and the ignorance which existed in regard to their natural progress and their moral treatment. Paracelsus and Sennert speak of it in very favorable terms. Ettmüller says that it was never otherwise than greatly useful to him "in melancholic delirium with or without previous furor."

Werlhof, Bergerus, and Joerdens have given facts to support this treatment in the "Comm. Nuremb." Kinneir was successful four times; Fériar and Laughther gave it several times without success; Cullen obtained nothing from it, but cites a case where he saw it produce manifest effects.

Pinel does not pronounce upon the question, though he believes that in mania large doses of antispasmodics may be indicated. It seems to us very hard to seize on the indication in a class of diseases which vary so much in cause, whose symptoms and course are so fluctuating and irregular, and so little controlled by the salutary efforts of the system.

Priapism.—Does the sign given by Avenbrügger in his work entitled "Experimentum nascens de remedio specifico sub signo specifico in mania virorum," as an index for the use of camphor in mania, relieve us of embarrassment? We cannot say, for the point has fallen into oblivion,

which may or may not be justified by the constant worthlessness of the sign.

Avenbrugger says that camphor cures especially mania in males, when accompanied by the following condition: "1, penis contractus, exilissimus; 2, scrotum corrugatum, vacuum; 3, ambo testiculi ita retracti, ut ad coxum abdominis prope introducti appareant." Another condition is of less importance: "Vulsio mannum ad interiora." The existence of the latter sign allows us to predict the former. It seems to be sufficient with women to authorize the use of camphor.

In cases which combined these conditions, Avenbrugger began by unloading the bowels by antiphlogistic purges; he bled from the foot until the signs of plethora disappeared; bound the maniac to his bed, kept the bowel constantly covered with warm emollient fomentations, and prescribed, until the cure was absolute, a mixture containing 2½ grammes (gr. 38) of camphor in tweny-four hours. All these observations reported by Avenbrugger in his interesting work relate to maniacs with furious delirium and fever, almost all of whom were thrown into this state by moral causes. He neglected the fearful excitement which seemed to appear under the influence of camphor, and had adopted the following maxim: "Vis maniaci ni eludenda est, ubi de remediorum externorum et internorum accurata administratione agitur."

The diminution of the symptoms occurred in a regular order, always announced by a successive and graduated reduction of the genital parts to their normal state. After the first twenty-four hours, the penis is longer; at the end of the second, one of the testicles has descended to the bottom of the shrunken scrotum; after seventy-two hours the other also descends. From this time the patient's state is as follows: profound sleep, abundant sweats, and entire freedom from fever the next morning on awaking; if asked, he complains only of great muscular fatigue, a consuming hunger, and the annoyance of his bonds. The doses are then gradually diminished, though they are kept up a long time after the disappearance of all symptoms.

This is certainly precise and unequivocal. No one will deny that Avenbrugger saw what he saw. The learned physician had, also, terms of comparison. He had occasion to see treated, and himself to treat, a very large number of maniacs, according to the method of Nicolaus Sedana, his master. This treatment consisted in bleedings at the foot, alternately with emetics, for a long period; and the patients recovered less promptly than when they took camphor. But it must be said that the energetic preparatory treatment of Avenbrugger may have had much to do with the cure.

These facts, however, have an interest; and if we have rather lingered over them, it has been in order that physicians may have their attention called to the point in semeiology which they illustrate, and to its value as related to the indication for camphor, with Avenbrugger's precautions. All those who have prescribed it in mania have used large doses with per-

severance, and attribute the failure of others to the neglect of these two conditions of success.

How far is the famous adage of the Salernian school justified—"Camphora per nares castrat odora mares"? The great number of facts confirms the anaphrodisiac action, while a smaller number tends to discredit it. The services rendered in dysuria by this remedy, in diseases of the urinary passages, give a presumption in favor of this sedative action, and our own experience has seemed to justify it. But, like all the effects of camphor, it appears very variable. Ricord attributes to it an eminent virtue in such cases.

Atonic ulcers.—The external use of camphor is less variable in its effects. In unwholesome scorbutic, dartrous ulcers, spontaneous gangrene, hospital gangrene, it has a real anti-putrid virtue, too often proved to be doubted. These were the cases in which Collin chiefly used it, giving it internally at the same time when these external lesions seemed to be under the influence of a general vice. This favorable action of the powder of camphor upon wounds affected with hospital gangrene has been freshly proved by Dr. Netter of Rennes (*Acad. des Sciences*, 1871, No. 9, and *Bull. de thérapeutique*, 1871, I., 235), and by Warlomont of Brussels (*Gaz. des hôpit.*, 1871, No. 48; *Bull. de thérap.*, 1872, I., 93).

It is used as camphorated oil of camomile, in fomentations, for meteorism of the belly due to atony of the muscular coat of the digestive canal. Dissolved in alcohol, it is useful in slight sprains. Compresses soaked in this solution resolve ecchymoses, and disperse the swelling and pain of sprains. In this form it is used in embrocations for rheumatism and chronic neuralgia. It is also prescribed externally in all cold engorgements, applied to the limbs when weakened after fractures, etc., to the breast to drive away the milk in newly confined women; and to the liver in certain engorgements of that organ. It is beneficially sprinkled upon resolvent poultices. It has often succeeded thus in our practice. Several authors have advised disengaging its vapors in places where there are several patients suffering from putrid and gangrenous diseases. It is incorporated in certain ointments used for eczema, etc., to appease the irritation of the skin, prevent itching, etc.

Erysipelas.—Malgaigne (*Gaz. méd.*, juillet, 1832) has made some observations on this point. He says that neither the ancients nor the moderns speak of it. Junker, Ponteau and Murray, however, describe it quite clearly. To judge of the real value of a remedy in erysipelas, we must understand fully the natural course of the disease; and then we see clearly that, whatever Malgaigne may say of it, the cases of internal erysipelas, *preceded by fever*—what we call *medical erysipelas*—which he considers as a proof of the good effects of camphor, have gone on without change in the face and the hairy scalp in spite of the medicine, and that the latter had no real action except in cases of surgical erysipelas originating at the border of external lesions. Malgaigne's conclusions are valid only in reference to the latter class. He rightly thinks that, by the intense cold

which it causes in the parts where it is applied (between wetted compresses, which are sprinkled from time to time), he might replace ice in cerebral affections. Sprinkling camphorated ether is the most convenient way of using camphor locally in ambulant erysipelas and erythema. In this way the ether is volatilized rapidly, in contact with the inflamed skin, and a thin layer of camphor remains upon the parts. We use it thus frequently and successfully. Much value has always been ascribed to resolvent collyria made with camphor, and we think justly so. There are few ophthalmias where its use is not desirable.

Antagonistic substances.—After Murray's example, we have sought to bring together, at the close of this article, all the cases in which, combined with other remedies which are usually very powerful, camphor is considered capable of lessening their deleterious effects without disturbing the end for which they are administered. These combinations are chiefly made with the drastics, with nitrate of potassium, cantharides, mercury, cinchona, and opium.

Some say that the action of camphor, as a corrective of that of cantharides upon the genito-urinary organs, is an almost infallible specific. We have witnessed this repeatedly. Others, especially Junker, Cullen, and Barbier of Amiens, deny this, and say that camphor increases the accidents which it is intended to calm. These divergencies prove merely that the influence is not exercised in a constant way. We hope that practitioners will not neglect it. When they have to use a large blister, especially upon a child, it will be well to sprinkle it with camphor, which is better than giving it by the mouth. This property of camphor confirms that which we have already noticed in chordee and retention of urine, and is itself confirmed by it.

When camphor was much used in the treatment of inflammation and fevers, it was almost always associated with nitrate of potassium, which increased its sedative force and prevented the inconveniences of the stimulation which it sometimes caused. The usefulness of its combination with drastics, in order to relieve their too irritant action, seems to us very hypothetical. Taken with the preparations of mercury, it is said to lessen their antivenereal powers, and the salivation. The facts on which this opinion is based have not been accepted. Lassone and Hallé have ascribed to it the power of preventing the narcotic effects of opium. The reasoning is quite in harmony with the opinion admitted by Murray, but rejected by Cullen and Orfila. The English nosologist thought that camphor was capable of increasing the antiperiodic virtues of cinchona.

A chemist (Raspail) who has sought notoriety everywhere, has outbidden the old physicians in his enthusiasm for camphor. A piece of this substance will take the place of all the agents of the materia medica—we were about to say, all those of operative surgery.

The popularity of the author of so marvellous a discovery forces us, rather against our will, to communicate it to our readers; and in order to escape the charge of exaggeration, we will let Raspail himself speak.

But before introducing him, we will say that it is in virtue of a pathogenic theory peculiar to the author that camphor has become at a stroke the savior of sick humanity. All diseases are caused by the presence of insects in the system: camphor is a powerful insecticide; therefore, etc. What answer is there to that?

"1. Take a double-celled tobacco-box, one of whose compartments contains camphor in impalpable powder, while the other is intended to hold small cigarettes of camphor, the construction of which I shall give, and we have a little portable pharmacy suited to a multitude of cases. The cigarettes are little tubes of straw, or writing-quills of the smallest size, containing crumbs of camphor, which are kept there by two bits of papier joseph; these cigarettes are smoked like a common cigarette, but in the cold—that is, by simply breathing in through them, swallowing the saliva which they give rise to. The powdered camphor is to be taken like snuff, of which it has all the hygienic advantages with none of the objectionable points, for the powder is hardly a sternutory at all, and produces no discharge, colored or otherwise, so that it may be used by ladies, children, etc., in all cases where tobacco is indicated as a hygienic remedy or for pleasure.

"2. The second apparatus is a linen compress, soaked in alcohol saturated with camphor, and a surtout of rubber or parchment or bladder, or linen heavily stiffened with gum or starch, the size of which is such that the patient can be enveloped in an atmosphere of camphor. If the disease has attacked the whole surface of the body, this surtout may be replaced by a sac of skin or of heavily stiffened linen.

"It may give surprise at first if I say that by these two instruments a multitude of disorders which are slow to recover, and even rebellious to all other treatment, may be relieved instantly, and sometimes dissipated as by enchantment. I beg physicians to believe that I am aware of the impression this will make, but desire them to pass on as I have done, and try the plan. I appeal, not to their memories, but to their conscience; and the conscience of the physiologist is entirely in his experiments.

"3. In all affections of the chest which can be classed as cough, rheum, catarrh, influenza, chokings, phlegm, whooping-cough, croup, let the patient hold a cigarette of camphor constantly in his mouth; let him inhale the air almost exclusively through this tube; let him take from time to time a pinch of camphor powder, though he may dispense with this as a simple accessory; the attacks will diminish in intensity, and will be less frequent, if they are not wholly stopped. The patient will soon feel a sensation of comfort which is almost sudden when the lungs are simply engorged.

"4. Analogy leads me to think that the constant and unbroken use of cigarettes of camphor is capable of dissipating all the symptoms of pulmonary phthisis, at least during the first stage; and prudence would make it a duty to try it even in desperate cases.

"5. There is one fact, about which I have not the least doubt, namely,

that pains which proceed from a pulmonary adhesion, such as the patients call stitch in the side, are dissipated almost at once by the compress of camphorated spirit, and the cigars. I dare not say that it is the same with affections of the heart other than well characterized aneurism; but I have strong reasons for inclining to the affirmative; and the remedy is so inoffensive that one runs no risk in a useless attempt.

"6. In affections of the stomach which resist antiphlogistics, the trouble is found to disappear by the use of cigarettes alone; and I should like to advise the pharmacists to add a centigramme of camphor to the quart (1—10,000) in their mucilaginous syrups, for sugar has the power to dissolve this substance. The effect of this almost insignificant addition can hardly be believed till tried. Those who have pain in the stomach when fasting are instantly relieved by inhaling a cigarette, and there is nothing more hygienic than the habitual use of this remedy. For more than three months I have constantly used it by the mouth; and I miss something whenever I am forced to do without it.

"7. In diseases of the viscera of the abdomen, enteritis, intermittent and typhoid fevers, etc., cholera, yellow fever, affections of the liver, spleen, kidneys, womb, etc., let the whole surface of the abdomen be covered with the compress of camphorated spirit, frequently sprinkled, and imprisoned in its surtout; let the patient be forced to inhale through this tube alone, or that of any special apparatus which the special circumstances may direct, and let the treatment in no case be interrupted until the end of the disease; the effect will be of the heroic order. I have seen intermittent fevers cut short by the simple application of a piece of camphor to the pit of the stomach.

"8. It is the same in diseases of the skin; but as a general rule, and in this case more than any other, we must never use the compresses without using at the same time the cigarettes and the camphorated syrup. In other words, we must never envelop the epidermic surface with a camphorated atmosphere, without covering the mucous surfaces also with vapor of camphor, or a slightly camphorated liquid. This is the way to prevent repercussions, in cases where they are to be feared.

"9. Any one who has charge of a contagious disease in man or beast should snuff or smoke camphor, unless he already uses tobacco; but in neither case should he interrupt for a moment this treatment, and his clothes should be strongly impregnated with the smell of one or the other substance. I repeat it, all the power of the preservative lies in its being constantly used.

"10. In diseases of the cranial cavity, not inflammatory, the head should be constantly wrapped in the compress, and the cigarettes and the snuff also taken. The trouble will soon pass off.

"When a horse is threatened or attacked with the glanders, let a large bag of camphor be tied to each end of the bit, so that the air inhaled by the nostrils shall carry a large dose of the vapor; and let the stable-boy use the remedies as above. I dare affirm that the cases of glanders would

be less frequent in France if the stables were kept cleaner, the walls better plastered, the spiders' webs removed more carefully, and particularly if frequent fumigations were made of tobacco, or if the horse were accustomed to carry a small bag of camphor at the nostrils constantly; while from time to time the orifice of the nostrils should be washed with camphor-spirit.

"11. Diseases of the ears and eyes are in general relieved by pouring powder of camphor into the auditory meatus and keeping it there with a piece of cotton, and by sprinkling a little of the powder on the conjunctiva. The slight pain felt at the first contact by the conjunctiva is very brief in duration. Let a crumb of camphor be put in the hollow of a carious tooth and kept there with sheet lead or papier-mâché, and the pain, acute as it may be, will pass off in a few instants, and sometimes the progress of the caries will be checked; if the pain returns or the caries continues its progress, we recommence.

"No great importance should be attached to the dislike felt by some persons for camphor, which is sometimes imaginary and conventional; in any case, it passes away in a few minutes if the patient can force himself to smell no other odor. The impressions of our senses become blunted by constancy and uniformity."

Our aim will be fulfilled if the exposition of so many snares and absurdities preserves the reader from the seductions of a dangerous empiricism—inexplicable, if the love of truth alone inspires it.

In sum, camphor seems to share the properties of several classes of remedies. Its contro-stimulant effects greatly resemble those of digitalis, squills, hellebore, aconite, etc. It also has very marked antispasmodic properties, which most resemble those of musk and castoreum, for the special indications which are fulfilled by the latter are equally fulfilled by camphor. Like musk, it is more efficacious in the grave nervous symptoms which accompany the acute febrile diseases than in the primary nervous symptoms which form neuroses. Its stimulant effect is very uncertain and accidental; it depends on too many conditions which cannot be united and diagnosticated, to be of use; in cases where it has been expected to be valuable, its antiseptic virtue has been the one chiefly manifest; for it seems to have advantages in the diseases called putrid, which can only arise from this virtue. Applied locally, it has incontestable resolvent properties. Its antiseptic virtues also recommend it in this case.

Ethers.

Ether seems to us to combine the properties of the antispasmodics with those of the stimulants. It is the connecting link between the former and the latter of these classes, and we have placed it because its method of action is more like that of the antispasmodics than the former. The annals of the art, and our daily observations confirm this. Besides, in

speaking of stimulants proper, we shall show that they also are powerful antispasmodics; immediately and ultimately, at least, if not purely, excessively, and by themselves like valerian and the gum-resins.

The antispasmodics have properties in common, which may take the place of one another to a certain degree. Each of them, however, has specialties of action which, not exclusively its own, still give it the preference when this action is to be employed. Thus ether is particularly applied in certain forms of nervous affection, which it relieves better than its analogues; while the latter have the advantage in other conditions.

The more superficial, mobile, recent, impetuous, and sudden in appearance the spasmodic diseases are, the more control ether has over them. Let us develop this formula, and specify the special facts of which it is the expression.

Hysteria.—One would have a very false notion of hysteria who should believe in its existence only as it bursts out in the most exaggerated phenomena, and should require, in order to recognize it, convulsions, chokings, loss of consciousness, etc. Like most essential diseases, it is vague, irregular, destitute of the calculable rhythm which characterizes inflammations and pyrexias. A very important thing to know is that it is decomposable, that is, that it may sometimes appear with all its symptoms, sometimes with a single one, two, or three, without ceasing to be itself. The good observer suspects it from a few yawnings followed by sobs and broken sighs without appreciable cause; he sees it in the simple palpitations of the heart in young girls in which the chest seems to swell; in a transient dysphagia, in a sudden meteorism which changes its position and seems to wish to escape by the upper part of the digestive tube, where it produces a sort of strangulation; in a spasmodic hiccough, in a jactitation which seems involuntary, accompanied by impatience and deep sighs; in a word, in all those vaporous elements which, united and carried to a high degree, constitute the hysterical attack, and which, thus attacked, yield as by enchantment to a few drops of ether, and yield with the more rapidity in proportion as they are recent, isolated, and undecided. As to their intensity, it is not always a contraindication of ether. Women are often thrown into the greatest nervous disorder by a few hysterical accidents, and suffer from considerable palpitations, a great choking, etc., who are brought into a sudden and profound calm by a teaspoonful of syrup of ether. The picture we have drawn recalls valerian and its indications. These two agents are closely analogous, in fact, and among the antispasmodics they most readily take the place of one another. Both act rapidly, but briefly, and are quickly expended. They differ from gum-resins in other points, which will be given in the general chapter on Antispasmodic Treatment.

If the word *hysteria* is inapplicable, etymologically speaking, to man, it is not so in regard to the special nervous state which it designates. Many men suffer all the spasmodic symptoms we have named above, especially the flatulences and palpitations. Ether is very useful to them.

Certain nervous persons are subject to sudden and partial congestions which have none of the characters of those caused by plethora; bleeding would increase this kind of congestions, for they are often due to excessive loss of blood, but ether usually dissipates them. It is the same with the unequal distribution of heat in the same persons. By itself, it relieves the horrible pains of spasmodic ileus, and is given successfully in gastrodynia, convulsive vomiting, nervous cough. It is in popular use for children's convulsions, especially during teething.

Long ago, passing the night with a child of two years, tracheotomy on which had been performed for croup, we had occasion to convince ourselves of the antispasmodic virtue of ether. This child, at whose autopsy we found both lungs full of false membranes and plastic mucus as far as the capillary bronchi, was extremely agitated, and had frightful orthopnœa; this was a case to refuse antispasmodics, in accordance with the pretended axiom of pathology "Sublata causa," etc. How, then, did it happen that at each dose of ether the unhappy child was quieted and slept, but was soon aroused by the return of the suffocation and convulsions, as the action of the ether was transient and required frequent renewing—and so on, more than ten times, until death occurred in the morning from the incessant progress of the asphyxia and its cause?

Visceral spasm.—In its double character of a diffusible stimulant and an antispasmodic, ether can render immense services, may avert impending death in a case of gouty metastasis to the heart, brain, or splanchnic nervous centres. Threatening syncopes, dreadful cardialgias, delirium, unexpected apoplexies, due to this cause, are relieved in a few instants by large doses of ether taken at once. Whenever any disease leaves its natural course and becomes complicated with some nervous symptoms, draughts containing ether will dissipate the complication; this is especially seen in irregular exanthemata, and fevers of bad character.

There are cases in which the system, plunged into profound and direct adynamia, demands aid of tonics, and in which the latter, encountering a nervous system too fatigued to respond to their action, require, in order to be felt and to produce their effect, the addition of a stimulant to arouse the vitality of the solids and bring it up to a point where the tonics are useful. Ether may thus form an adjuvant to cinchona, etc., though less specially than some other stimulants, as the acetate of ammonia, for instance. The cases of radical cure of croup given by Pinel and Alibert by the use of fumigations with ether can only be ascribed to an error of diagnosis. It is sufficient to read their observations in order to see that they had to deal with false croup and stridulous angina; we readily see its efficacy in the latter affection.

The inhalation of ether from a bottle in syncope, fainting, etc., is well known. Pinel recommended it for young girls who are made amenorrhœic by excessive nervous mobility; Tissot, to relieve nightly pollutions caused by a too active imagination. We cannot speak in regard to the value of ether in biliary calculi, so much praised by Durande, Sœmmering,

and Richter. Did these physicians have simple cases of hepatic colic in which the antispasmodics are very suitable? In any case, it is not the mere presence of the calculus that causes colic, but the spasms induced by the foreign body; and it is very possible that ether, without acting on the calculus, may quiet the colic, that is, the expulsive nervous irritation. The proof lies in the fact that the colic ceases although the calculus remains. Ether passes for a diuretic, and we have observed this fact in a certain number of cases. Desbois of Rochefort gave it with benefit in intermittent fevers, when they were reduced to their great state of simplicity (as he says); he thus suspended their periodicity, as may be done by anything which acts powerfully on the nervous system. We know that, in combination with cinchona, it may be of great use for some symptoms of the pernicious intermittent fevers. In almost all the forms of these grave affections it is well to combine the action of the diffusible antispasmodics with preparations of cinchona.

Tænia.—Bourdier has proposed to treat tænia by ether. He gives 4 grammes (3 i.) of sulphuric ether in a glass of strong decoction of male fern, in the morning fasting; an hour later, the worm being supposed to be put to sleep by the anodyne action of the ether, 2 ounces of castor oil are given to expel it. If it is presumed to be in the intestine, a clyster of 8 grammes of the same anthelmintic is given at the same time the draught is taken, and the purgative is given afterward. When the tænia is in the stomach success is certain. Bourdier reports fourteen cases in which his remedy was used; five of these, in which the tænia was in the stomach, were cured in three days; of the nine others, three, with the worm in the intestine, were delivered in three days, four after two treatments, and two retained the parasite.

Hoffmann's celebrated anodyne mineral liquor is only sulphuric ether qualified with a little alcohol; the name has been given to the last product of the distillation of ether, to which a little of the heavy oil of wine is recommended to be added. Hoffmann lauded this famous liquor in all the cases in which we have recommended ether.

Externally, ether is sometimes indicated; cases have been reported in which, all the means of reducing strangulated hernia having failed, ether was applied over the tumor, which all at once lessened in volume and re-entered the abdomen. The plan is easy and can always be used before surgical incision is made. In intense cephalalgias, migraines, ether applied to the forehead and temples may relieve by the sudden cold which it causes. When applied by rubbing it dissipates rheumatic and neuralgic pains.

Cholera.—We have had great success with the syrup of ether in epidemic cholera, in the dose of a tablespoonful every hour, given with ice and a slightly stimulant draught, like infusion of mint. We suspended its use entirely when a little warmth returned and the radial pulse was felt. To this simple and moderate stimulation we owe a moderate reaction, quite often free from that typhoid state which includes interminable phlegmasiæ of bad character and destroys so many patients.

Amber.

Amber burns at a very high temperature, swells up without melting, and gives a yellow and green flame, with a very strong smell. Formerly used in the form of oil and tincture, it is now entirely banished from the materia medica, and cannot replace castoreum, musk, and ambergris. Succinic acid is obtained from it, which, combined with ammonia, gives a salt of which we will speak later.

A rooted popular notion considers necklaces and toys of amber as an excellent preventive of convulsions in children. Our confrères will hardly expect us to discuss the value of such an idea; but we cannot pass in silence over some very odd facts which are perfectly authentic, but which are not, and probably will not be, explained by physicians.

We were consulted in 1840 by an old soldier living in Brittany, who was subject to the most curious phenomena. The least unexpected noise, the sight of an object which excited him somewhat, produced a nervous disturbance with frightful spasms, extreme oppression, palpitations, partial and momentary paralysis. We advised him to wear around the trunk, the limbs, the neck, strings of amber beads, and he was so much benefited that in two months we received from him a letter announcing his cure. This singular treatment was suggested to us by reading an observation of the same sort, reported by Dr. Gérard in the *Journal des connaissances medico-chirurgicales.*

Singular and incredible as these facts may appear, unworthy as they may be of scientific credence, they must not be wholly forgotten. After trying all the remedies which experience can suggest, we should not neglect the empiric remedies which, on some rare occasions, have been found to succeed.

We have seen attacks quieted in an asthmatic young lady by placing a chaplet of ambergris beads around her chest.

Can the electric properties of amber give probability to these extraordinary therapeutic actions? This may be ascertained by repeating facts which are so easy to obtain and so innocent in any case.

Linden-Flowers.

In speaking of these flowers, Murray says: "Ad medicum forum pertinent." They are, in fact, the best-known antispasmodic, though the least active; and they could much better take the place of tea in domestic use than that of valerian. They are chiefly given in infusion to aid digestion when impeded by some emotion or sudden impression. They also form a light and agreeable diaphoretic. Their use as an antispasmodic should be limited to that of a vehicle for other more active agents of the same order, in the form of infusion, or better, of distilled water. These

preparations are nevertheless able to relieve symptoms of nervous mobility, and some vaporous forms of the most elementary sort. F. Hoffmann praises their virtue in epilepsy. Who would dare to rely on it?

We often use infusion of linden in full baths for nervous persons (500 grammes=1 lb. for a bath); and we think we are sure that it adds a decided effect to this powerful calmative agent. It seems also certain to us that enemata of infusion of linden are more calming than those of tepid or cool water, which are so soothing to those who have not exhausted their effect by continued use.

Murray says that drying destroys the medical properties of linden-flowers. Mérat and Delens affirm the contrary. This is probably due to the fact that the latter take special care in drying them. They remove the peduncle, the bracts, and dry them quickly; then they put them in paper bags and place them in very dry cases.

Orange-Flowers and Leaves.

The flowers and leaves of the orange-tree (Citrus aurantium, C. bigaradia) are known to every one. The water distilled from the former is so commonly used that we need not describe it; it is more powerfully antispasmodic than that of linden-flowers, and much less so than valerian (see under General Antispasmodic Treatment).

The essence of orange-flowers bears in commerce the name of néroli; it is used to prepare an artificial distilled water, which ought to be disused; it is recognized by mixing it with a few drops of sulphuric acid, when the liquid remains colorless, whereas the water distilled from orange-flowers is colored a bright rose.

The powder and decoction of the leaves of the same tree have had a reputation less ancient, but almost equal to that of mild valerian in St. Vitus's dance. Dehaen relates the wonderful effects of it; in his time there was an enthusiasm for the remedy, which is found diminished in Tissot, Home, and other foreign practitioners. To obtain the antispasmodic effect of water distilled from orange-flowers, we must give it by tablespoonful doses and not by drops.

Navelwort.

The Cotyledon umbilicus is a very poisonous plant, a native of England, where it grows on old walls and rocks; belonging to the family of the Crassulaceæ.

The juice is vulgarly used in Ireland for epilepsy; it is also recommended in asthma; Thomas Salter of Poole, Buller of Southampton, and Graves of Dublin have praised it, but Dr. Ranthing of Norwich says that he has obtained no benefit from it. The portion given is the juice; the dose is 4 grammes (ʒ i.). It must be continued a long time and in increasing doses.

Narcissus (Daffodil).

In 1815 a physician of Valenciennes, Dufrenoy, spoke of the flowers of Narcissus pseudo-narcissus as valuable in nervous affections, and especially in epileptic convulsions and tetanus. More lately Michea has repeated the trial, and found it valuable in nervous affections.

The narcissus belongs to the family of the Amaryllidaceæ, and the powder of the flowers is the part used; it is emetic in the dose of 1 or 2 grammes (gr. 15—30); the extract is more active.

Blache, Senior, used it very often as an emetic for children. René Blache, by Maingault's advice, repeated the trial. He infuses the powdered flowers for twenty minutes, in the dose of 3—5 grammes to 150 grammes of water (gr. 45—75 and ʒ v.) for children from three to five years of age. The emetic is very certain, and acts in ten minutes. The plant must not be infused longer than twenty minutes, because then the infusion becomes bitter and produces cramps of the stomach. If well prepared, the infusion is not at all disagreeable, and children take it without repugnance. Caventou gave to the active principle of the plant the name of narcisséine. Jourdan subsequently found another substance, narcitine, which exists chiefly in the bulb (Soc. de Thérapeutique, 8 mars, 1876).

The following formulæ have been proposed:

Syrup.

℞.	Flowers of narcissus	1 part.
	Water	2 parts.
	Sugar	4 "

Vinegar.

℞.	Flowers	1 part.
	White vinegar	8 parts.

Oxymel.

℞.	Vinegar of narcissus	1 part.
	White honey	4 parts.

Sumbul.

Under the name of Sumbul or Jatàmensi, or Musk-root, the people of the Indies, of Persia, and all the East, have long employed as a perfume, as incense in religious ceremonies, and in medicine, a root, the botanical origin of which is unknown, but which Granville considers as belonging to an umbellifer of the genus Angelica. It grows in British India and the mountains of Nepaul; it is imported from Russia through Kiatka, which is generally the place of sale for rhubarb, and is thence distributed to all Europe.

The physicians of Moscow and St. Petersburg made the first medical experiments with it. In 1840 it was used in Russia for cholera, and was praised beyond measure.

Sumbul is a homogeneous, whitish, thick root, varying in diameter from 6 to 10 centimetres (2½—4 inches), and cut in round pieces 2 to 4 centimetres thick; its taste is warm and aromatic; it contains a volatile oil, two resins which give it its odor, and a bitter substance which Reinsch has called sumbulic acid.

Oxide of Zinc.

Taken internally, this remedy has been used for all the neuroses, but chiefly for epilepsy, whooping-cough and convulsive cough. As to its value in epilepsy, the testimony is about balanced on both sides, so that a decision is really impossible. We have used it repeatedly in large doses, and without the least success. It seems to be more certainly of use in the other nervous affections. Nothing is proved in this respect. We should do ill to use our pages in consecrating them to chronicle the names and quotations from all countries for or against this agent. Other more important questions will have to take precedence. If oxide of zinc is destined to attain deserved credit as an antispasmodic, the indications are to be found in the chapter on that treatment.

At the close of the last century, a physician of Geneva published in the *Journal de Vandermonde* (déc. 1779, t. LII., p. 518), numerous cases of the use of flores zinci in a great many essential convulsive disorders, especially in children. He says that no antispasmodic equals it; if it is not successful, the reason is that the doses are too small. He gives as much as 3, 4, 5, and 6 grammes (gr. 45—90) per diem, without even causing the least bad result. The paper is very well written, and gave us some confidence and the desire to follow up the use of the remedy in children's convulsions and hysteria. Another distinguished practitioner of Geneva, Herpin, recently praised greatly the results in epilepsy; but his practice was repeated here by one of our most distinguished alienists, Moreau, of Tours, and did not correspond with the expectations. We think we have been more fortunate in eclampsia and the convulsive affections of childhood. The greatest number of facts concerning oxide of zinc will be found in Gmelin ("App. medicam") and in the last volume of Mérat and Delens. It forms a part of the pills of Méglin.

Acetate of Zinc, $C^4H^3O^3,Z_nO+3_{aq}$.

Almost all the salts of zinc with organic acids are considered as antispasmodics. The acetate, formerly used in nervous affections, was nearly forgotten until some time ago, when Rademacher published a paper on the salts of zinc, and especially the acetate.

It is obtained by dissolving hydrocarbonate of zinc in acetic acid, or by precipitating a solution of acetate of lead by sulphate of zinc, filtering, and passing a current of sulphuretted hydrogen to remove the excess of lead.

It is a white salt, crystallizing in nacreous plates; it is odorless, and has a bitter styptic taste. It is given in solution in water, or in pills, in the dose of from 1 to 6 grammes (gr. 15—90).

Lactate of Zinc, $C^6H^5O^5$, Z_nO+3_{aq}.

This salt has been praised by Herpin, of Geneva, in epilepsy. It occurs in the form of white plates, formed by the union of small, prismatic needle-shaped crystals, with four sides terminated by obliquely truncated summits. Its taste is sugary and styptic.

It is obtained by saturating lactic acid with hydrocarbonate of zinc. The dose is ten centigrammes (gr. iss.) thrice a day; its use should be continued a long time.

Powder (Herpin).

℞. Lactate of zinc..... 1—16 grammes (gr. 15— ʒ iv.).
Powdered sugar of milk .. 5—20 " (gr. 75— ʒ v.).
M. F. chtt. 20; three per diem.

Pills (Herpin).

℞. Lactate of zinc..... 1—16 grammes (gr. 15— ʒ iv.).
Syrup of gum arabic ..... q. s.
F. pil. 20 vel. 40; 3 to 6 per diem.

We have spoken elsewhere of the valerianates of zinc. The phosphates have also been used.

Valerianate of Bismuth, $(C^{20}H^9O^3)\ Bi^2O^3$.

This salt (a subvalerianate) was proposed by Giovanni Righini, as a valuable antineuralgic; he also praised it in gastrodynia and chronic gastralgia.

It is obtained by decomposing acid nitrate of bismuth by valerianate of soda; the precipitate is washed and dried by a moderate heat; it is kept protected from the light and air. Doses, 25 centigrammes (gr. 4) to 10 centigrammes (gr. 1½) in pills, three times a day.

Subcarbonate of Bismuth, CO^3, Bi^2O^3.

This salt was praised by Hannon, professor in the university of Brussels, as having the properties of subnitrate of bismuth, while it is more soluble in the gastric juice.

It is obtained by precipitating acid nitrate of bismuth by a solution of carbonate of sodium.

The lactate of bismuth is obtained by decomposing acid nitrate of bismuth by lactate of sodium.

These two salts are used in the same doses and in the same way as valerianate of bismuth.

Cerium.

This metal was discovered in 1804 by Berzelius and Hisinger in cerite, a mineral composed of oxide of cerium, silica, and oxide of iron.

Professor Simpson of Edinburgh has used the nitrate and oxalate of cerium as sedative tonics; in dyspepsia with gastrodynia and pyrosis, for chronic vomiting, and especially the vomiting of pregnancy.

Dose, 5 centigrammes (gr. 0·75) two or three times a day in water.

GENERAL ANTISPASMODIC TREATMENT.

We shall not study under this head all the means which are useful in combating the spasmodic or nervous condition, but only the pharmaceutic agents which have a favorable effect upon the disturbances of innervation, directly, essentially, and without the intervention of any appreciable action between the remedy and its effect. If, instead of accepting this restriction, we include in this chapter all the remedies which various circumstances may make legitimate in the treatment of spasms, we should have to review the whole materia medica.

Two examples will illustrate this.

A woman, always previously well, experiences different nervous accidents, as palpitations, dyspnœa, some convulsive movements, eccentricity of character, a little constriction in the throat; then she complains of a sense of repletion in the stomach. For some days she has had no appetite; the tongue, covered with a thick yellowish coat, is flat and trembling, and the mouth is bad; there is nausea. Observing that these nervous symptoms were never felt before, and that they came just after the bilious attack, and in a degree exactly proportioned to its increase and duration, you prescribe an emetic; and the next day all the saburral symptoms, plus the apparently grave spasmodic symptoms, have wholly disappeared. Must we on this account regard tartar emetic or ipecacuanha as antispasmodics? No one would dare to do so, although they have cured a spasmodic condition. But this spasmodic state was provoked by a cause which the emetic abolished, and which, being removed, left our patient in her original condition in which she never had had nervous symptoms. We might have chosen bloodletting, purging, tonics, etc., and by adapting them to the different conditions of the system, might have obtained the same results. We have chosen for our example gastric embarrassment, because the association of the two morbid states is not rare; we have very often found them associated, and have seen both cease under the influence of a remedy which appealed to the primæ viæ.

In another case, a woman calls herself nervous, is subject to spasms, and has the same symptoms as the former, except the bilious state. Here the spasm is essential, primitive—that is, nothing preceded it, and it composes all of the disease. You give 2 grammes (3 ss.) of valerian, and in

a moment everything is in order, without your finding it possible to seize upon a phenomenon which lies between the remedy and the cure.

In the first example it is very certain that the administration of an antispasmodic would not have been wholly without influence upon the nervous state; but the influence would have been imperfect, momentary, because the nervous state is very distinct from the saburral element. Nevertheless, as the latter was the determining condition of the former, it was a simpler plan to address it, by the aid of means specially adapted to put an end to it.

In our second example, the spasm is essential, and we required to reverse no intermediate cause in order to reach it. This is also the reason why we used a direct remedy suited to re-establish the deranged innervation by its own power. This requires a definition; but let us remark that though there be antispasmodics which possess in addition an unquestionable stimulant power, the credit is not properly due to the latter, which does not usually count. When we study excitant treatment, we shall show that its occasional antispasmodic action is but secondary, through a physiological action foreign to that of valerian and the fetid gums, for instance.

It is not sufficient for us thus to limit the antispasmodic agents: we must do the same for the various morbid states which are the object of this treatment. Thus we are forced to enter the realm of pathology. Therapeutics is the science of indications; all that can throw light upon them belongs within its scope.

In the reform of Broussais, the diseases which we have to speak of were violently dethroned. They were called fictitious entities, and were ranked with the generality of symptoms of various pathological states, which states were almost all considered to be local, and were held to be the sole proper object of treatment. But nature does not submit to this convenient simplification. It is more than 2,000 years since the school of Cos, under the influence of virgin impressions, sketched these affections in the strong outlines of their most essential features. From Cos to Leyden, from Leyden to Montpellier, they have been preserved in their proper physiognomy, their especial progress; but more numerous, complicated and invasive in our times, after having been increased and multiplied by all the additions made by the incessant physical and moral revolutions of the nations.

For some years past the school of Paris has felt the necessity of attending to them; and their natural history already shows the new exactitude which governs these researches.

These sorts of affections find their way everywhere. They complicate other diseases, they embarrass and retard their course, prevent their natural solution and their beneficent movements. If Hippocrates saw so many crises, and so much regularity in the course of the diseases of which he has left the history to us, if his treatment was so simple, so expectant, it is because the number and gravity of spasmodic affections being then less, nature was able to display herself fruitfully and without obstacle in the fulness of her forces; for, just as any digestion or nutritive function is

better performed in the silence of the system than in the midst of a disturbed innervation, so also a fever or an inflammation reach their term with phenomena better consociated and a more calculable course, in proportion as they are less crossed by nervous disorders.

If this were the place, we would draw from this simple observation some highly important theoretical and practical observations. As this subject, though old, and profoundly appreciated by the old authors, is new in relation to the present direction of thought, it is indispensable for us to say what should be understood by *spasm*, *nervous state*, *spasmodic state*—which we will consider as synonymous terms—and especially to seek to distinguish this class of diseases from a crowd of others, by the side of which nosologists have placed them, which are founded on a merely superficial examination and gross resemblances between symptoms. This distinction being made, we shall consider the antispasmodic remedies in their relations: 1, to the primitive "nervous state" which of itself composes all the disease to be combated; 2, to the nervous state, as it supervenes, first upon acute affections, then upon chronic affections; 3, to the symptomatic nervous state in both these classes of affections. We shall finally give some general considerations regarding these remedies, both by themselves and compared with other classes of therapeutic agents and their mode of administration.

No one, as far as we know, has tried to explain why the physicians of past centuries gave to certain spasmodic affections the denomination of *passions*, σπασμώδεα πάθη, passio hysterica, passio hypochondriaca, passio dyspnoïca, passio mesenterica, etc. The expression was generally known to be equivalent to "disease." Yet they did not say "passio erysipelatosa, passio febris biliosa, passio squirrhosa," etc. Such profound observers must have had their motives. Was it not that these movements of the soul which we call also affections, sentiments, instinctive phenomena, spring from the same source as the essential spasms, excite analogous disturbances, fulfil themselves (in a word) according to the same physiological laws, and really differ from them only because they belong to the pathological order? This cannot be doubted; and the fact is one of those which attest most clearly the admirable sagacity of the ancients. Unknown to themselves, Hippocrates, Democritus, Galen, almost all the Arabian physicians, in the last two centuries Rivière, Ettmüller, Hoffmann, Sauvages, Cullen, etc., and in our times Dubois of Amiens, have traced, in their theory of spasms, that of the passions and the instinctive acts; while on the other hand Bichat, Cabanis, Broussais, in developing the only true theory of the passions and the instinctive acts, have wonderfully laid bare that of essential spasms.

And first let us hasten to say that the instinctive movements, like the essential spasms, emanate from the different centres of action of organic life. Both are executed without the influence of will; it is their characteristic to subdue it more or less completely. A few examples, borrowed from the observation of man in health, which pass by insensible shades into ana-

logous phenomena which are distinctly pathological and spasmodic, will clearly show us the nature of the latter and justify the proposition which we enunciated above.

A man is shut up for some time in a place where the air is rarefied by heat, or he is oppressed by ennui, sadness, or sleepiness; for some reason the oxygenation of the blood in his lungs goes on imperfectly. All at once, a vague and undefinable anxiety seems to rise from the bottom of his chest, and, without the participation of his will, respiration becomes a little hastened, the jaws open by degrees, as it were convulsively; all the inspiratory forces exert their maximum of effort, and by this beneficent spasm a considerable quantity of air comes to satisfy the imperious necessity of hæmatosis. If the causes of oppression have acted for a longer time, if the ennui has been more profound, there comes a second set of synergic movements, consisting of stretching, that is, a forced and, as it were, tetanic extension of the trunk and limbs, and a special grimace.

If the cause and aim of these efforts were not physiological, no one assuredly would see any difference between them and spasm or convulsion. And more than this: they form one of the symptoms in the complicated group called hysteria, and are then arrested by antispasmodics, such as ether.

What interval, other than that of internal cause, separates the sudden palpitations, with swelling of the chest, oppression and instant flushing of the cheeks, which suddenly seize a young girl whose modesty is shocked, from the same symptoms when forming one of the thousand caprices of hysteria, and relieved by a few drops of the same antispasmodic remedy? Compare the numerous influences which the innervation of the abdominal and thoracic viscera experience from the affections of the soul, whether agreeable and expansive, as joy, pleasure, anger, pride, or sad and concentric, as moral pain, fear, fright, etc.; let these be compared with various spasms termed asthma, palpitations of the heart, hysterical faintness, præcordial anxiety, flatulency, dysphagia, hiccough, nervous aphonia, intestinal rumblings—*vapors*, in one word; and let us try to find between them any difference, other than that of the order of affection in their development, progress, and duration. We readily see that it is impossible.

What is more like convulsions than the incessant and *involuntary* tossing which torments a man who is a victim to any visceral disorder, especially if dyspnœic? In a great many diseases, the last scenes of agony are spasms of various contractile organs, which seem to be making a last effort to grasp life. "In mortis agone constitutis, convulsiones sunt naturæ ultima naturæ conamina" (Sauvages).

There exists in woman a physiological act which, to our view, is of great value in determining the point of origin of the attack of hysteria, and which singularly confirms the belief of those who regard the uterine nervous system as the focus of this neurosis; this act is coition.

Take as a type a woman who feels acutely the impressions which ac-

company the performance of this natural act; precipitate and tumultuous beating of the heart, respiration superficial and frequent, interrupted and sobbing sighs, the eyeballs turned up, the neck and trunk thrown back, clonic and convulsive movements of the pelvis, contractions of the limbs, sometimes permanent, sometimes clonic, but *always involuntary;* finally, at the moment of consummation, *spasmodic* tremor and agitation of the whole muscular system, stifled cries, sometimes complete fainting, and then the system falls into a state of resolution and languor which induces a gentle sleep.

Without intending it, we have described the second degree of an hysterical attack. How does this happen, except that the hysterical spasm and the "cynic spasm" (a very picturesque and correct name for the movements which take place in coitus) originate in the same source and are developed according to the same laws?

If this series of examples were not sufficient to prepare our readers to understand the nature and mechanism of essential spasmodic affections, we might, by multiplying them, show that all the pathological spasms have their analogues in the physiological order, but with this very important difference, that the former recognize a morbid persistent principle, increasing and becoming complex in proportion to the persistence and gravity of the predisposing or occasional causes, while the second cease as soon as the producing cause ceases.

It being well proved that the essential spasms have the same point of origin as the instinctive acts, to wit: the different viscera or organs of general life, we have in this characteristic a precious aid to diagnosis, and especially (which is the object of this chapter) a capital *criterion* of therapeutic indications, as we shall see.

We may now venture upon a definition. Essential spasms are primary disturbances, usually without fever, of the innervation of one or several viscera concerned in the life of nutrition and reproduction—disturbances which, when limited to erethism, mobility, and functional changes of the viscera, compose that crowd of troubles called "vapors;" but when they excite involuntary contractions and disorderly movements, partial or general, in the muscles habitually governed by the will, are termed "spasmodic convulsions."

These preliminaries are rather long, and may seem foreign to our subject, but are indispensable; for, as no one has as yet attempted to place the antispasmodic remedies face to face with their special morbid indications and to fix the conditions for their success, they are hurled indiscriminately against all diseases of the nervous system, and failure, which is often due to an inappropriate selection of cases, is attributed to the remedy. If nosologists had looked to the bottom, and had used all the characteristics of neuroses in classifying them, including those derived from the different treatments—characteristics so fundamental—they would have saved us the trouble of saying to which of their spasms the remedies we are describing are mostly inapplicable. Such instances are furnished by *primary* neu-

roses of sight, hearing, etc., epilepsy, tetanus, the different metallic tremors, *primary* delirium, etc.

Pinel states that the neuroses which are curable by antispasmodics are those called *neuroses of digestion, of respiration, of circulation, and of generation*, all of which are classed by Cullen under the name of *spasms of the vital and the natural functions;* with the exception of some cases in which the spasm is only an element and is not the whole disease, as dysentery, whooping-cough, pyrosis, cholera morbus. The neuroses which we have excluded from the category of primitive spasms (the only ones subject to antispasmodics) are all destitute of the essential sign which we have attributed to the latter (the local origin of the *aura*, which always begins in the organs of the two great visceral cavities), and resemble them only in one way, namely, in the nervous anomalies without lesions of structure, and the convulsive movements. But, as these symptoms are the most salient and the most coarse, they have been chiefly relied on for comparing the two classes of diseases, which are notwithstanding very distinct. It would be easy to show that Willis, Glisson, Baglivi, and more lately Haller and Gall, were the authors of this confusion.

I. Antispasmodics, as Related to the "Nervous State," when Primitive and Constituting the Entire Disease.

In the articles on valerian, asafœtida, ammoniac, ether, etc., we have already given most of the important indications; but there are still a few general ideas to be expressed in regard to the degrees of affinity and repulsion, more or less marked, which exist between certain spasms and certain antispasmodics. That we may omit nothing, we shall arrange the shifting pictures of the primitive spasmodic state in the order of increasing gravity, and shall particularly show them as related to the therapeutic agents we are studying.

1. *Nervous Mobility.*

First, what is nervous mobility?

It is a state intermediate between spasm and the normal visceral innervation. It touches on the vaporous condition, immediately precedes it, is its necessary condition, and requires only an increase in the intensity of its symptoms or the intervention of the slightest cause, to rise into it. Nervous mobility is very often nothing but the highest degree of a predisposition to spasms. It is this state in an exaggerated form, ready to pass into disease at the least shock. It is constitutional in many women. Hoffmann has admirably described it; and Gorter, under the title of "Mobilitas," has shown its conditions and *facies* as well as can be done. In many persons it is acquired and accidental. A soft and luxurious life, in-

dolence, prolonged dieting, convalescence from grave disorders, excessive evacuations of all sorts, especially of blood, chagrin, fear, all the depressing passions, hypochondria, the abuse of too warm baths, all that debilitates; in one word (and this is a very important mark), all that enfeebles the cerebral energy and exalts and makes viciously predominant the visceral innervation, produces nervous mobility. We shall soon make this proposition clear and distinct by showing how it rests upon observation.

The characteristic signs of nervous mobility, before it engenders the vaporous condition, are: sudden impressionability, continually recurring from the epigastric centre; præcordial anxiety, flushes of heat in the face, involuntary starting at the slightest surprise (a door shutting, a touch, or an unexpected word from some one not seen, cause such disproportioned emotions); panic fears, vain and unreasonable susceptibility, tears for no cause, excessive pusillanimity, an unmeasured effect from a slight electric overcharge of the air, a fright which may produce syncope in the presence of thunder and storm, etc.

This organic disposition, at a certain degree, may be combated and palliated by antispasmodics. Though we may not hope to destroy the diathesis by such remedies, we may nevertheless, when it is exaggerated, lessen the more annoying symptoms, and thus avert an attack of vapors. For this purpose it will often be sufficient to take every morning two grammes of powdered valerian, suspended in a cup of infusion of linden-flowers, and in moments of the greatest mobility a few teaspoonfuls of syrup of ether or a glass of sugar-water with a good deal of orange-flower water. As regards other remedies, we have indicated the way to remedy the conditions of nervous mobility and its symptoms more radically.

2. *Vapors and Spasms.*

They have variable characters, according to the point of origin of the aura, a condition which also brings to pass certain differences in the degree of efficacy of antispasmodic remedies. The old pathologists fixed at three the number of foci whence the aura seems to arise; the epigastrium, heart, and genital organs. They ought to have added the region occupied by the small intestine. We will begin with the class in which the "aura" begins in the digestive organs. These are in general the most movable, and those which have the least effect on the muscular innervation.

Epigastric anxiety is, as every one knows, one of the marks of nervous mobility. It is sometimes so incessant and intense that it causes nausea, rarely actual vomiting; cardialgia, which takes away the strength, produces the blackest and oddest sadness, and (worst of all) takes away the appetite, prevents digestion, and produces a gaseous distention of the stomach, followed by explosive, noisy, not fetid, not acid eructations. This state, when prolonged, produces also gastralgias distinct from frank neuralgia of the stomach by the spasms of the œsophagus and the transient

dysphagia which are associated with it, by the pain, which is less acute, but is rending, and is accompanied by a moral depression which goes to the point of despair. According to Sauvages, a very prolonged icterus sometimes follows. For the first group of symptoms (dyspepsia, odorless flatus, etc.), the use of powdered valerian immediately after, or even before eating (2 grammes in the first spoonful of soup), is a remedy which we have often found successful; but asafœtida is preferable. When there are also purely spasmodic vomitings, or that kind of gastrodynia which we have described, ether in large doses often succeeds, according to the best therapeutists. Camphor combined with henbane has also been highly spoken of in the same circumstances.

There are cases where, in very nervous persons, the aura originates from the right hypochondrium, accompanied by poignant and erratic pains, great anxiety, continual tossing, continual and odorless eructations, abundant evacuations of a green and thin bile—crude, to use a term which very well expresses our idea—which in a great many cases is discharged upward; this group of symptoms having been preceded by other nervous troubles, and that profound discouragement which always comes from the spasms whose aura proceeds from the digestive organs. This is the famous bilious colic, so well described by Sydenham. In spite of the authority of Boerhaave and Van Swieten, who tried to refute Sydenham upon this point, and to show that this group of symptoms was always symptomatic of a hepatitis, of biliary calculi, or a condensation of the bile which could not flow through its channels, it cannot be doubted that the state is due to a purely nervous trouble, though less often than the English Hippocrates thought. We know a lady in whom the nervous mobility exists in the highest development, and who often suffers, from all the symptoms given by Sydenham for this trouble, in the exactest way. Antispasmodics and cold baths are very useful to her.

When pain predominates, the animal antispasmodics must be preferred: musk and castoreum. It is probably in these cases that ether has been so successful in the hands of Durande, Richter, and Soemmering. Although in this singular affection antispasmodics are not the only remedies that are of use, and though they sometimes fail, they ought always to be used, and combined in various ways with opiates and calmatives in general. The icterus, which is sometimes the last stage, is not to be cured by the remedies we are now studying.

There are certain nephritic colics which simulate calculous colic and are of the same nature as those we are describing, and require the same treatment. The abdominal spasm appears more frequently as *anxiety*, or *mesenteric passion*, as some of the old writers called it. This state is accompanied by borborygmi, tympanitic swellings coming and going rapidly, tumultuous and violent beatings in different parts of the abdominal aorta. Asafœtida is more successful in this sort of vapors. In pills, or better in enemata, in the dose of 2 grammes (gr. 30), it easily relieves these flatulencies; and it is the remedy to be employed when valerian fails with wo-

men. The intestinal spasms are quite frequently manifested, especially in men, by colics simulating ileus, which cause such depression of strength, with pallor and cold sweats, that prolonged syncope has been seen, followed by death: this is the nervous iliac colic, on which Barthez has written an excellent monograph. Musk, and especially castoreum, camphor, ambergris, and amber, have seemed to act better than other antispasmodics in this case. Draughts will be preferred to enemata, though the latter may not be forbidden; ether should almost always form a part of them.

Let us come to the spasms with a thoracic *aura*. These are palpitations of the heart, choking, convulsive cough, and asthma; we do not include hiccough, certain anomalies of phonation, or the nervous aphonia, which should be classed, the first with precursory symptoms, the other two with the sequelæ of violent attacks of hysteria.

Palpitations of the heart, so common in nervous persons, yield to a few drops of ether, when they are not intense, constituting a true disease; but sometimes they are continual, raise the chest forcibly, are accompanied by night with profuse weakening sweats, limpid urine, cold feet, a dry, nervous pulse with a force surprisingly disproportioned to that of the shocks which the eye often can see in the region of the heart; they prevent the patient from undertaking the slightest work. Though at first they indicate no anatomical lesion of the heart, they may be the cause, or, at least, the first stage of it. They present this gravity in women rather than men; we do not refer to hypochondriacs. The most active antispasmodics ought to be used by turn in pills and draughts. Valerian and asafœtida will be preferred, and will usually put an end to the palpitations if they comprise all the trouble. But as they are in a great many cases dependent on hypochondria, it is necessary to inquire closely about that condition, the existence of which will generally prevent the remedies from being radically useful.

The word "choking" will, doubtless, surprise some pathologists. Yet we do not know any more suitable name to give to certain pantings, which might be called spontaneous asphyxias or nervous dyspnœa; a peculiar state of pulmonary innervation, which it would be too absurd to connect with an organic lesion; a state which is not asthma, which is neither an apoplexia nor even a congestion of the pulmonary parenchyma, but which is one of the thousand vaporous forms, and which greatly torments certain persons. The air may enter easily to the bottom of the lungs; inspiration may be deep and repeated; still, a sense of asphyxia oppresses the patient; it seems all at once (for these chokings are always sudden in their attack) that the blood has not been oxygenated, that the pulmonary nerves are paralyzed. This state is common to both sexes; it causes anguish and profound melancholy, begins by making itself felt four or five times in a day, for three or four minutes, but at last leaves only a few moments of rest in the day, during which the patient yawns continually. Ether, taken at the moment of these spasmodic attacks, when already intense, distilled orange-flower water, if not intense, and the daily use, morning and even-

ing, of pills of asafœtida in the quantity of 2—4 grammes (ʒ ss—i.) a day, will render great service in this very distressing sort of spasm, which may become dangerous by the melancholy and muscular weakness it brings on.

It is a necessary condition (as in palpitations of the heart) that these spasms of asphyxia should not be due to a hypochondriac state; which, we must say, is pretty common.

The convulsive cough is more commonly a trick of hysteria than a special independent spasm. Yet sometimes it is isolated and more rebellious, perhaps, than any other spasm. It is unexpected, very frequent, but does not come in spells, is not dyspnœic, has no expectoration, presents only negative auscultatory signs, and is sometimes interrupted by chokings or spasms of the œsophagus. Experience is in favor of asafœtida, or oxide of zinc combined with opium, or even belladonna.

Our task is not to prove that there exist essential asthmas, that is, independent of all material lesion of the larynx, lungs, heart, and great vessels. We will suppose these facts known and admitted. Galen classed essential asthma among the spasms. Rivière, Willis, F. Hoffmann, Baglivi, and Sauvages did the same by calling in all the marks of the affection and comparing it with the other spasmodic and flatulent diseases. Capillary catarrh, which usually accompanies the asthma, is not the cause of it. As with all the pulmonary neuroses asafœtida holds the first rank among antispasmodics in the treatment of asthma. Ammoniac, little applicable to the other spasmodic forms, has in this case a specific effect attested by all our predecessors. The disease too often resists these remedies when most skilfully used, and then other agents must be preferred—as we said under the poisonous solanaceæ. A frequent cause of these checks is the fact that the asthma, although purely nervous, is a morbid expression which in very many cases takes the place of other affections. Thus the gouty principle has the sad privilege of often putting on this form; certain evacuations, for instance, those of piles, or ulcers of the legs, or dartrous affections, etc., on disappearing, are replaced by an asthma which antispasmodics have no power to cure, but only to palliate. It is then necessary, before using them, to look carefully for the cause of the disease, in order not to throw blame on remedies which we have often seen give great relief.

It is not without use to add that the periodic asthma which returns every night (for example) during a fortnight, then ceases, and reappears later with longer duration and greater violence, and thus progressively grows, is less suited by antispasmodics than certain asthmas which prefer to attack younger men, which have a less periodic course, are remittent rather than intermittent, and taking an opposite course, decrease with the progress of age. The former should, nevertheless, be attacked with these remedies; but we have thought that the influence was more doubtful, and, in particular, less entire and durable.

Asafœtida alone, and ammoniac also, alone, or associated with soap where there is with the nervous symptoms a tenacious and crude phlegm,

expectorated abundantly at the close of an attack, are here the antispasmodics *par excellence.* They must be given largely, and every day in the quantity of 2 grammes (gr. 30) at first, then of 4 or 8 grammes (3 i.—ii.), in pills; when the asthma has disappeared they must still be continued, suspended a few days and then resumed; and that several times and for a long period. The patient must keep a certain quantity of his pills in order to take them immediately after the presumed beginning of an attack; and while it lasts, draughts containing ether will lessen its violence and may hasten its end.

We shall see in an instant that the existence of pulmonary or cardiac lesions in asthma is far from being a contraindication in all cases to the use of antispasmodics.

Let us now speak of spasms which have their aura in the organs of generation. The woman alone will receive our attention, for, while there exist hysterical men, in the sense of *vaporous*, while there are certainly those who have a thousand essential spasmodic troubles, amounting to convulsions (though rarely so), the aura in these cases always emanates from other nervous centres than those of the reproductive system, and hysteria, in the rigor of the term, belongs only to women.

In some authors of the last century there are observations relating to boys who have reached the age of puberty, in whom the spasmodic aura manifestly springs from the genital organs (spermatic cords and region of the seminal vesicles in particular), and upsets the rest of the nervous system of nutritive life, even causing convulsions entirely in the manner of the hysterical affection. But these cases are very rare, and always end favorably with the complete development of organs which, by their rapid predominance, played, for a moment, with youths the part of a tyrant like the analogous organs in women.

Of all spasmodic affections those of which the aura is hysteric in its origin are the most obstinate, the most complicated; almost alone, they solicit disorderly movements in the muscular system of animal life, and subjugate the cerebral centre to the point of suspending for an instant all its attributes. As we already have said, in speaking of the various antispasmodics in particular, they may simulate all the other spasms, and may be the cause of all separately and of all simultaneously.

Very few women are entirely free from them: "Fœminarum enim paucissimæ ab omni horum affectuum specie prorsus liberæ sunt, si istas excipias quæ, laboribus assuetæ, dure vitam tolerant" (Sydenham). We know how the whole woman is influenced by the uterine system during the period of its functional life. Democritus expressed the idea thus in a letter to Hippocrates: "Sexcentarum œrumnarum innumerarumque calamitatum auctorem esse uterum."

The spasmodic symptoms of hysteria will be the better relieved by the remedies spoken of in this chapter, in proportion as the symptoms are isolated, vague, recent, and extend to a thousand anomalies of the innervation of the different organs of the belly and chest. It is chiefly in women

with very marked nervous mobility, of a delicate vaporous complexion, that hysteria is limited to effects upon the innervation of organic life. In the latter, the hysterical passion less frequently reaches the voluntary nervous system, it rather "sets up its tyranny" as Hoffmann says, in the vital functions; but there also it has a thousand forms, and by itself reproduces all the simple and painful spasms whose aura may originate in other organs. But the second degree of hysteria, which is characterized by convulsions and suspension of the action of the senses and the cerebral centre, more frequently attacks powerful, strong women, those who are least "nervous." This was well observed by Sydenham: "Feminæ quibus hæc species, quæ uteri strangulatus vulgo audit familior est, temperamento sunt ut plurimum plus quam solet sanguineo et habitu corporis ad viragines accedente."

With the aid of the general precept just given, and the numerous indications formulated under Valerian, Asafœtida, and Ether in particular, the practitioner may select antispasmodics adapted to all hysterical symptoms.

Ought the convulsive attacks of hysteria to be treated, in order to check their course? No; unless by their severity or duration they threaten to interrupt the action of one of the functions most directly necessary to life. "Si paroxysmus levior esse solet, absque ulteriori spirituum perturbatione, sua sponte pertransire permittatur" (Willis).

Hysterical women desire the attack, they seek to bring on convulsions, from the experience they have had that a frank and violent attack puts an end to the state of anxiety, to the thousand and one visceral spasms, to what Sydenham calls "mæstiora illa πάθη," which are the precursors of the attack. "There is an observation which all physicians may have had occasion to make, but to which Camper alone seems to have called attention: it is that persons who are subject to congestions, and in whom different causes may bring them on, if one of these causes has occurred to them and has disturbed them considerably, cannot usually return to their normal state until they have had convulsions; it is like the state of a cloudy sky, which cannot clear itself without a storm" (Tissot).

An abundant discharge of tears, or of copious and limpid urine very often forms a crisis which takes the place of convulsions. This is as if we said, that one person, under a great vexation, feels the burden lightened by the tears she sheds, while another is relieved if, heaping up for a long time her wrath, she can as it were evacuate these causes of torment and anguish in a flood of bitter words, and with semiconvulsive movements which are not made by her will. These are proofs which add support to our opinion of the nature of essential spasmodic affections.

But how ought we to act, in the supposed case? The most powerful means of recalling a woman who is suffocated in an attack, or plunged in a cataleptic or comatose condition which seems dangerous, are scarcely found among antispasmodics. Some of these substances may, however, be brought near the nose; the most active, and those smelling the strongest.

Musk, castoreum, ambergris, burnt feathers, and camphor have always been used for this purpose. Plasters of these substances placed on the bowels have always seemed to us of very doubtful action. Given in clysters, if that be possible, they should act more powerfully.

As for the practice of Forestus, its indubitable success is owing to the cause indicated above. The proof is, that many before him had had the same success, but with the finger alone without antispasmodic mixtures. Galen and Avicenna recommend the titillation of the clitoris. Ambrose Paré described it, without mentioning the use of the drug on the finger, which shows that the effect is due to the titillation alone, and not to the medicine, as would be the case with any active impression capable of awaking the woman's instincts and recalling the vital forces to movements of self-defence. This is what Ætius refers to in the following words: "Os ægræ aperiatur ac medius digitus ad vomitum proliciendum intromittatur—et super hæc omnia, mulier magnis vociferationibus excitatur ac vocetur." These practices are more allowable than those of the Galenists and the Arabs, of whom Sennert says: "Frictio ista (of the clitoris) a christiano medico suadenda non videtur." Whatever means of this sort are employed, their object and theory are, to break the chain of certain pathological instinctive emotions, and replace them by physiological instinctive emotions. This is what the famous indication amounts to, of the direct application of antispasmodics to the genitals.

It is needless to say that the antispasmodics are inefficacious in "grands spasmes," such as catalepsy, ecstasy, and all those forms which are no longer seen in our day, but of which the middle ages were full.

Among the sequelæ of very severe hysterical paroxysms, there are some which constitute new diseases, and others which consist only of more or less obstinate vestiges; the latter, in general, obey the antispasmodics quite well, while the former demand more energetic means, and of another order.

These consecutive accidents may be divided into two series, according as they follow.

1. Intense attacks, at long intervals; in this case they are of two sorts, the former of which resembles nervous mobility, while the latter comprehends spasmodic fever, hysterical stupor, and divers troubles which chiefly affect the sensibility and movement of the organs of relation.

2. In women who have very long suffered from all the hysterical troubles; who, without having had complete and violent attacks, have fractional or incomplete ones, not *critical*, seeming not to form a sufficient crisis to the spasmodic affection, but very often renewed, and for the least cause; who also, for a long time, have experienced vaporous hysteria in all its forms. The condition which chiefly separates the latter from the former is, that in the former the interval of attacks is filled with an incessant series of visceral spasms, a state which by degrees impairs digestion, alters the secretions and insensibly affects all the assimilative functions. These unhappy women, before reaching organic lesions properly called

(which are quite rare in their case), pass through a series of nervous disorders so continual, so general and so grave, that they form epitomes of the whole class of the neurosis, from the mobile spasms to the most obstinate insanity; and in other cases are brought by the fever, insomnia, and perversion of all the nutritive acts, to general atrophy or cachexias, etc.

Chlorosis is very often thus generated. It is thus that we must explain why the writers of the last centuries recognized hysteric scorbutus, and placed it as one of the sequelæ and products of hysteria: "Quamvis autem satis pateat originarium hujus morbi (hysteria) fomitem in humoribus nullatenus stabulari, fatendum est tamen (quod res est), spiritum ἀταξίαν illam, cui morbus debetur, humores putridos in corpore coacervandos gignere, cum tam illarum partium functio quæ vehementiori spirituum impulsu distenduntur, quam earum quæ illis privantur omnino pervertatur. Cumque harum pleraque organa sint quasi separatoria, excipiendis conoris recrementis designata, si eorum functiones quovis modo lædantur, fieri non potest quin ingens fæculentiæ colluvies accumuletur. Huic ego adjudico CACHEXIAS insigniores, ἀνορεξίαν sive appetitus prostrationem; in juvenculis chlorosin sive febrim elban (quam quiedem speciem esse affectionis hystericæ non dubito), aliamque omnem malorum lernam in quâ immerguntur misellæ, quotquot hoc morbo diu elanguerunt, quæ omnia a succis putres centibus in sanguine congestis, atque exinde in organa varia depluentibus, succrescunt" (Sydenham), Willis, Gorter, Hoffmann, Wyth, etc., have shared these opinions.

As regards antispasmodics in these consecutive troubles, the nervous mobility will indeed depart of itself, but its termination may be hastened by valerian and ether, as already mentioned. As for the spasmodic fever and the various odd paralyses, the aphonias, amauroses, hemiplegias, etc., valerian and asafœtida, with which the celebrated Wyth was so successful in like cases, sometimes remove them, as we have seen; but their combination with other remedies, of which we shall speak later under sedatives, cold affusion, for example, forms a much more potent remedy; here antispasmodics are useful agents, but of the second order. Nevertheless the spasmodic fever often dispenses with all treatment except valerian or asafœtida, in enemata.

The second series of consecutive trouble is almost always the stumbling block of the antispasmodics. For this reason Pomme, whose work was almost wholly written under the dictation of such facts, proscribed so bitterly and so exclusively this class of agents, and formed a theory (cornification of the nerves) in accordance with which he rejected everything that was not "humectant" and "relaxing." But the confidence he commanded, the assurance of his judgments and his promises, and his charlatanism, contributed as much to his success as his prolonged tepid baths and chicken-water.

There remain three convulsive or spasmodic affections in which our agents are advantageous, but only as accessories to other more appropriate remedies; these are eclampsia, infantile convulsions, and St. Vitus's dance.

They seem to be quite often deficient in that sign which almost always assures the success of antispasmodics, the visceral origin of the aura.

Valerian and ether for the first two, valerian and asafœtida for St. Vitus's dance, continued, in the latter case, a long time and in progressively increasing doses, will aid the action of the more energetic remedies which these diseases require. Eclampsia will rarely yield to them—whether owing to an absolute inefficacy, or to the impossibility of giving them. Children's convulsions, when they permit the introduction of syrup of ether, or oxide of zinc, will be benefited by them.

Going still further from the essential character which we have assigned to spasm, we meet with epilepsy, tetanus, hydrophobia, etc., diseases whose treatment may be described everywhere and nowhere.

The chief facts which we shall state are easily associated with some general considerations which find a fitting place here, and which will much aid in simplifying the problem for the student.

1. Those essential spasms which commence most abruptly, which are characterized as fleeting and mobile, which are abortive, incomplete, and in the condition of vapors (palpitations, chokings, hysterical globus, visceral anxieties, whatever the origin of the aura may be), are more specially related to the antispasmodics, which act on them instantly, briefly, and either relieve at once or not at all (water distilled from orange-flowers, valerian, sulphuric ether).

2. The pulmonary spasms in general obey antispasmodic remedies which have a more permanent effect. The fetid gums, at the head of which stand asafœtida and ammoniac, find in these affections their most important and express indication; the former of these substances is more certain than the others in relieving flatulence, and in general, all inodorous gaseous exhalations in man. Valerian is better for such symptoms in women.

3. Spasms with pain, the aura of which is almost always epigastric, hypochondriac or mesenteric, require more especially antispasmodics drawn from the animal kingdom, as musk, and particularly castoreum. We must place in the same category camphor, in the first place, next ambergris and amber, which experience has also shown to be fitting in painful menstruation.

4. Convulsive hysteria requires no treatment, except in rare cases. The affections which follow it do not respond favorably to the antispasmodic remedies except when they assume the vaporous forms. Their efficacy becomes doubtful in proportion as the disease resembles the great spasms, the primary neuroses of the animal functions, the paralysis, and the cachexiæ produced by obstinate visceral spasms maintained by irremovable causes, moral or otherwise.

II. The Antispasmodics, as Related to the "Nervous State," Considered as an Associate Element of Acute and Chronic Diseases.

"It is easy," says Tissot, "to see whether the nerves are suffering, but it is often very hard to decide whether they are affected essentially; whether the disease is properly nervous, or whether they are irritated by a foreign cause. In the latter case it is also necessary to distinguish whether the cause is to be attended to exclusively, or whether the nerves are sufficiently irritated to enable us to reckon on that state of irritation in the treatment." It is in this way that all great observers, all those who build up medicine, have conceived of therapeutics; and the words include the whole doctrine called the doctrine of the "elements."

It now remains to state the conditions which should characterize a nervous apparatus, in order to exist as an element and deserve antispasmodic treatment.

Tissot, in his "Traité des maux de nerfs," and Bérard, in his "Application de l'analyse à la médicine pratique," have little to desire in this important question. For rectifying the second of these authors upon a few points, and completing the former, the following rules may be laid down.

1. The acute diseases are rarely complicated with the spasmodic element. One of the reasons is that, from the rapidity of their course, and particularly from the synergy of their movement, independent affections have not time to enter. The nervous symptoms in them are almost always symptomatic, and bear an aspect (as we shall see later) which is not at all that of essential spasm. Besides, the vital force is, as it were, entirely absorbed in the organic reaction. There is a consensus of effort which, *a priori*, excludes the presence of acts characterized by aberration, chronicity, and absence of critical phenomena. Another reason, more directly opposed, is that in general this active reaction which constitutes acute disease is febrile, and fever is antipathic to spasms: "febris spasmos solvit" (Hipp.). The cases which form an exception to this law are all summed up in those which we discussed under musk, in treating of the use of the substance in malignant or ataxic pneumonias or phlegmasias.

2. In chronic, especially non-febrile diseases, when the system, scarcely reacting against the morbid cause, is almost in the same condition in which it is apt to be primarily affected by spasms, but with the additional predisposing element of feebleness; in such diseases the nervous element usually displays itself, and may be attacked along with the leading disease, without deranging the course of the latter; for such is the essential character of this element.

There are several classes of agents for distinguishing the element from the symptom.

First, we must consider the sex. Women, from puberty to the change

of life, have scarcely any chronic diseases in which the element of spasm does not deserve close attention, especially if they are endowed with a nervous, mobile, temperament, lead a sedentary and easy life, if they have experienced sudden and profound mental emotions, or previous hysterical trouble. "Apud feminas, semper suspicandum de fomite hysterico" (Baglivi).

3. The chief disease effects an organ which has wide sympathies; in this case the nervous phenomena may be merely symptomatic. But the severest data are drawn (as Tissot says) from the character of the nervous disease.

In our opinion the most positive proof that spasmodic symptoms in a disease are independent is the presence of a visceral aura. From this fact are drawn all the differential signs, the surest of which are: 1, that they do not follow, in their course and degree of severity, the course and degree of the primary affection; 2, that they come after it, without any connection with it, and usually in an abrupt way; 3, that they cease and return without appreciable cause; 4, that they end without apparent crisis; 5, that they attack indiscriminately all the organs with such odd symptoms, so opposed to one another and to the known nature of the chief lesion, that they have never been seen to follow from it, and that it is unreasonable to regard them as the effects of one and the same cause; 6, that they coexist with several of the symptoms of nervous mobility, —cold feet; convulsive pulse (that is, frequent, lively, hard, dry, compressed); production of inodorous gas in the digestive tube; abundant, clear, insipid, odorless urine, considered by Boerhaave to be weakening, so that he thought that a great quantity of animal spirits was dispersed with the urine. The characteristic of the urine has been immensely valued by all authors. "Inter omnia vero quæ in hoc morbo comparent phænomena, illud maxime proprium est atque ab eo fere inseparabile, quod scilicet ægræ urinam subinde reddant plane limpidam, ad instar aquæ e rupibus scaturientis, idque satis copiose; quod quidem ego sigillatim percunetando, in omnibus fere didici signum esse pathognomonicum eorum affectuum quos in fæminis hystericos, in maribus hypochondriacos appellandos censemus (Sydenh.); 7, that they generally disappear if the disease, previously chronic, assumes an acute and feverish form; and increase and multiply if the disease is treated by excessive bloodletting, etc. In all these cases the nervous element will claim antispasmodics for the same reasons, by the same laws, and the same mode of administration as when the spasmodic affection formed the whole disease.

The importance of these developments justifies the extent which we have given to them and the frequent and distant excursions that we have made in the field of pathology. Let physicians be assured that without these sources of indication it is impossible to succeed in the treatment of chronic disease, especially in women. With these entirely clinical distinctions the maxim of organic medicine, "sublata causa tollitur effectus," becomes truly small and false. There are cases where this axiom seems

much more specious, yet is equally delusive; when, for example, the spasmodic affection has its aura in the organ or the system of organs which is also the seat of the material lesion. Here the error is more difficult to avoid—yet by the aid of these formulæ it may be avoided.

Let us take for an example the most frequent case, that where an organic lesion of the thoracic viscera coexists with an asthma. Since anatomy has exceeded its rights, asthma has ceased to be anything but a symptom. Science has so obscured the art of observation, that asthma was better known to Aretæus than it is to the greater part of our modern pathologists! Not once, but fifty times, we have seen patients affected with pulmonary or cardiac lesions in an advanced stage, who were relieved of nervous asthmas associated with these lesions by the use of antispasmodics. They had asthma no longer; they kept, with their incurable lesion, proportionate functional troubles, which steadily followed all the degrees of the organic affection. In such a case the antispasmodics destroy only the superadded element, and leave the symptom.

The proof that in these cases asthma is but a symptom, is that it is essentially intermittent, that it has very often outlasted the lesion without conforming to its successive developments; that, still more frequently, it has pre-existed, and takes a great part in the production of the disease from which it is said to be derived; that it then supervenes under circumstances and influences which were adequate to produce it independently of the material lesions, which played the part merely of determining causes; that it has all the marks of primary asthma, which is no more like symptomatic asthma than the convulsions of acute meningitis are like those of an hysterical attack. It has been said that therapeutics lay wholly in diagnosis. This is true, provided the latter name be not attached to the coarse notions taught by the anatomical school.

Let physicians use asafœtida and ammoniac in the above cases; they will certainly find them as useful as we have found them. Chloroses may be the cause and the effect of intense and prolonged spasmodic affections. This consideration should determine the utility of antispasmodics in this disease. Spasms are usually the symptoms, and disappear successively under iron treatment. Sometimes they have sufficient predominance to require the use of valerian as a means of rendering possible and of seconding the action of the preparations of iron, which are the only radical remedies.

III. Antispasmodics, as Related to the Symptomatic "Nervous State."

The nervous symptoms which appear during the course of acute diseases are seen from the above to be almost always symptomatic. The affections of this class which are not spasms are mostly inflammations, fevers, or neuralgias: the latter, often acute in symptoms, are generally chronic in course.

It may be said that the nervous symptoms which are observed in acute inflammations and non-nervous fevers have not the aspect and character of spasm, as we understand it. These symptoms, when they occur, are always the expression of functional changes in the cerebro-spinal system, unless ataxia supervenes ; but this is not the time to treat of them, as the question enters into excitant and neurosthenic treatment.

It is the same with these symptoms in severe fevers and acute exanthemata. Under the head of camphor will be found the powers of antispasmodics in these cases.

In chronic diseases composed of organic lesions without fever, it is not rare to see symptomatic nervous phenomena, connected with the principal disease as effect with cause, improving considerably under the influence of large doses of antispasmodics. This fact, which will seem paradoxical, contains nothing more surprising than the cessation of excessive pain caused by cancer of the breast or womb, or by a piece of glass in very sensitive parts, after the internal use of opium or the external application of belladonna, etc. The whole secret lies in bringing the system into such a low degree of impressionability that the stimulus of cancer or the foreign body does not excite it. A man has pulmonary embarrassment with violent dyspnœa ; asafœtida, for example, will so modify his nervous system that he will be less actively influenced by the cause, which really remains the same, but acts on a person who is artificially made more patient. Of course this treatment is only palliative, and requires to be renewed every twenty-four hours, like opium in the cases with which we compare it.

The greatest benefit of this palliative treatment is that it prevents the symptoms from causing an increase in the primary lesion. This vicious circle, we know, is very common in diseases of the heart and lungs.

A circumstance has thrown much discredit upon the antispasmodics, especially in adult men and old men affected with spasms, having an aura alternately thoracic and abdominal; this circumstance is that these symptoms (which, in the case in question, do not always differ perceptibly from essential spasm) are very often symptomatic of irregular gout. Wyth considered the presence of the gouty principle in the blood as one of the most powerful and common causes of spasms. Musgrave, Cullen, and Barthez have admirably specified these cases, and have highly praised asafœtida, camphor and musk for the relief of those gouty manifestations which affect the lung, producing asthma; the heart, producing painful palpitations and frequent fainting; the stomach and intestines, causing endless eructations and atrocious colics. In gouty vertigo, Musgrave and Barthez have also specially lauded valerian, as well as all the antispasmodics called anti-arthritic (ethers, asafœtida, musk, camphor), in angina pectoris, which they consider frequently due to an irregular metastasis of the gouty state, as also certain apoplexias. Stoll made good use of valerian in a certain sort of St. Vitus' dance, which he thought symptomatic of gout. All these great physicians, who taught the art of not curing

gout, but of keeping it in the joints—whose treatment was contented with such success as consists in changing irregular and visceral gout into fixed and articular gout—never attempted by the aid of antispasmodics to do more than to conjure the form and place of the symptom: "In the analytic method of treatment, which suits the simplest case where gouty cachexia alone produces nervous disorder, it is necessary to *palliate assiduously* the symptoms by antiarthritic antispasmodics" (Barthez).

Let us finish with the following precept: antispasmodics are always useful in chronic diseases, whenever spasmodic symptoms are somewhat predominant and the state of the digestive tube is not opposed to it.

In concluding this chapter, let us cast a glance at the antispasmodics, considered by themselves, and their general mode of administration.

In our times the systematic spirit, not knowing what to do with the incontestable action of antispasmodics, has first denied their efficacy; then, as this denial was powerless against the experience of the ages, these remedies have been allowed to fall into oblivion, and it has been asserted that, since the progress of modern medicine had deprived spasms of their rank as a primary disease, we need no longer concern ourselves with their treatment, which was to be directed entirely toward the organic lesion. This opinion has not stood long against facts, and it has at last been declared that the antispasmodics were very exciting, incendiary remedies, and this reason has seemed the most alarming, for chronic gastro-enteritis from external causes, with all the degenerations that it involves, will long continue the terror of physicians.

We here declare that the authors who have maintained these propositions have been blinded by the spirit of the system, or have no knowledge of the facts they have advanced; they have used their facts forcibly to complete at all hazards a doctrine which required them. No: valerian and the fetid gums are not excitants; they are antispasmodics, and no more. We defy the explainers and the skeptics to go beyond that. We defy them to produce an artificial fever, however ephemeral, with 32 grammes of powdered valerian, as we defy them to calm a vaporous woman with 32 grammes (℥ i.) of brandy or any quantity of hartshorn.

Among a thousand facts which we might quote, here is a single one which a most lucky chance provides:

We were writing these lines when one of us was called in all haste to see a woman who had just "fallen dead" in the middle of the street. He ran, with his bottle of ether, and found the woman eight months pregnant and plunged in a profound hysterical stupor, and by her side a confrère who for some minutes had been engaged in making her inhale *pure hartshorn*, and even letting some of it enter her nostrils. The patient makes not the slightest sign. "Would you allow me to give a little ether to inhale, and put a few drops between the lips?"—"But this is hartshorn, it is much stronger than ether."—"You are perfectly right, but I am afraid that you will cauterize the nose severely. Ether is simply an antispasmodic." During this dialogue the bottle of ether had been placed under

the nose of the patient, and at the moment when it was put to her lips in order to pour in some drops, a profound sigh and some stretching movements preluded the very complete return of consciousness. The patient adjusted herself a little, rose and spoke.

We know that some antispasmodics stand on the borders of this class and of stimulants. They are of the class called diffusible; musk, camphor, and ether. Let us not forget that their exciting power is very inconstant, especially in the case of camphor, and that it would be impossible to say *a priori* whether they will develop it or no. Still, we repeat, the stimulant power is the one which is the least marked; it forms only a pretext for forbidding them, for valerian, which acts as powerfully as they do, is a pure antispasmodic.

We have always observed that the antispasmodics never had a more certain action than when the patients said they had not noticed any effect. The physiological effects of alcohol and of sulphuric ether are very different. Their therapeutic actions, though sometimes similar as regards the result, have scarcely any analogy in the manner of producing the result. How, then, do the direct antispasmodics act?

To say that they regulate the action of the nervous system is to say simply that they are antispasmodics. This, if it be paying ourselves in words, is at least not an expression of error, as when, after the example of some modern pathologists, more is specified, and it is said that they "regulate the action of the encephalon;" for the encephalon is not the focus of spasms, and is of no account in their direct production. It suffers, doubtless, more than other organs, violent impressions which pervert its three most important attributes, to wit, voluntary motion, animal sensibility, and the manifestation of intellectual acts. But these disorders are only sympathetic, and the use of the antispasmodics certainly lies not in modifying the organ which is functionally deranged. This question, which may seem idle, and would indeed be so if it were wholly a matter of scientific curiosity, demands developments, from which antispasmodic treatment may draw some benefit.

We tried to show at the beginning of this chapter that the essential visceral spasms always had a visceral origin, that the fact of a visceral aura formed the genius of the spasm, its genuine nature. We have also shown that therein lay the power of the instincts, which, far from originating in the encephalon, appropriate it and make it assist without the consent of will, in their conservative objects, the imperious and admirably blind demands of life which must be maintained. We must therefore seek for the reason of essential spasms in certain conditions of visceral innervation.

What do we learn from observation? In what circumstances does it show us the innervation which presides over the organic functions perverted in the manner which characterizes the spasmodic state? These circumstances are the following:

1. Deprivation of the materials on which the organs of nutrition act,

and which they elaborate. Nothing more surely develops nervous mobility and spasmodic affections than prolonged fasting, too severe diet, loss of fluids or blood carried too far. We can thus at pleasure create vaporous and hysterical women, flatulent men full of spasms, of nervous troubles, and soon hypochondriacal.

2. Another very efficient cause of the production of the spasmodic state are the passions, much more those which depress, as fear, all the moral anxieties, the sad affections, envy or unhappy love, etc., than the expensive and stimulant passions which double the vital energy, as anger, pride, ambition, and happy love.

If these passions, that is, if this pathological state due to moral causes, has so enormous an effect upon the production of spasms, it is evidently because the same centres of the system are interested, because their source is a common one. The opinion which assigns a visceral seat to the passions confirms our doctrine of spasms, which in turn enlightens and corroborates this opinion. This second cause, like the first, draws off the vitality of the viscera from nutritive acts, for nothing suspends and interrupts the nutritive elaborations so powerfully as the passions which develop the essential spasmodic state.

3. The presence of the gouty principle, chiefly at its beginning, and when it produces symptoms of vague, cold, or erratic gout. A great many men (and women are by no means all exempt) suffer for some years from the most various and numerous pains and spasms, which end in an attack of regular articular gout or a hæmorrhoidal flux, or simple hæmorrhoidal tumors without discharge, when all the symptoms of vague gout disappear at once.

4. A constitutional predominance, a primary and congenital excess of development of the visceral innervation and the centres which preside over it. We are forced to admit the fact when the spasmodic tendency depends on none of the preceding conditions. In this class of persons many vaporous and spasmodic disorders are produced by warm seasons, too protracted stay in a warm temperature, etc., while the assimilative functions are enfeebled and all the organs which perform the acts of nutritive life are cast into languor. We have already remarked that the mere existence of this temperament established nervous mobility in these persons.

5. The absolute, and, as it were, tyrannical predominance of the innervation of one organ or apparatus, such as that of generation in woman, during the whole of the period of reproductive life, especially when the system is about to enter into possession of its functions. This condition of development of spasmodic disease is the most frequent and fruitful; it is to this that hysteria and its innumerable phenomena are due.

We may omit some other conditions or causes of essential spasm, but we think we have stated the chief. To return to the question of the mode of action of antispasmodics, we have but one thing to say, which is that, by a property of which we do not know the mechanism, these agents have the power to appease or to regulate directly and immediately the perverted

visceral or ganglionic innervation. We cannot go further without entering upon the romance of therapeutics.

The therapeutic power of our remedies exist in very different degrees, and the results vary greatly in certainty and permanence, according as the spasms originate from the one or the other of these conditions.

In the first series, where the spasmodic affection has supervened upon excessive bloodletting or untimely diet, etc., the antispasmodics have truly an effect, but it is quite transient and merely palliative. Yet, merely as such, they have great value in relieving symptoms and paving the way for radical treatment.

Such radical treatment implies the restoration of the vegetative functions. The principle of treatment is to create a rich blood, and act so that the vital force shall be all employed in assisting the acts of nutrition; for these are the conditions opposite to those which permitted the development of the nervous spasmodic state. Under Tonic Treatment we spoke fully of the remedies fitted to restore nutrition and to give the visceral innervation a character of fixity, and an activity solely directed to reparative elaboration. Nothing so disturbs and destroys this condition as much as deprivation of food and of blood. In fact, the assimilation of these materials is the sole duty of those special forces, the perversion of which engenders spasmodic affections. The withdrawal of these materials deprives the forces in question of their object, their natural employment, which is as much as to say that they present only anomalies, deviations, irregularities; and this is precisely the character of essential spasms. Let us repeat that the tonics of the materia medica, first iron, next the true tonics, that is to say, a promptly reparative diet, and muscular exercise in the free air which converts this food to good use, form the radical treatment of the spasmodic condition developed by the first class of causes. The antispasmodics have then a palliative virtue which it is important to use.

This point in our theory of the nature of essential spasms, to wit, that these affections are very often produced by anything which diverts the visceral innervation from its duty as regards the maintenance of the individual, and in particular by anæmia—this idea, though implicitly expressed by Hippocrates and several of the physicians called Hippocratists, has not been clearly recognized and formulated, so far as we know, except by ourselves. Sydenham acted in accordance with this idea when he said: "Ex omnibus quæ nos hactenus abunde congessimus abunde mihi constare videtur, præcipuam in hoc morbo (hysteria) indicationem curativam eam esse, quæ sanguinis (qui spirituum fons et origo est) corroborationem indigitat; quo facto, spiritus invigorati eum servare possint tenorem qui et totius corporis et singularium partium œconomiæ competit."

As to the second condition which develops the spasmodic state, that is, the influence of the passions, the antispasmodics have but small action upon the cause; but these causes of passions, of violent and tyrannical feelings, when they have acted long and energetically, may leave the vis-

ceral innervation in a state of exasperation and disorder which, once acquired, persists of itself like an indefinite echo; this is an accidental nervous temperament. In this case the antispasmodics resume their rights and may concur in the cure of the spasmodic state; but as long as the influence of the passion lasts, the treatment must consist in the triumph of reason.

The spasmodic affections that are due to the existence of the principle of gout are palliated and mitigated in a quite satisfactory way by a certain class of antispasmodics. We have already spoken of the special properties of musk, camphor, castoreum, large doses of ether, etc., in this respect.

It is in the spasmodic affections dependent upon our first two organic conditions that the remedies we speak of have the prerogative of essential powers; for we have not to deal with any element beyond spasm. The malady is simple, the treatment should also be simple, that is, it should consist of one single order of remedies—whatever they may be. In this latter class of cases it is sometimes permitted, by means of strong mental influences, a full and strong diet, well-ordered gymnastic exercises—in a word, all the means of directing the entire visceral energy upon the nutritive functions—to obtain a more solid and permanent cure than by antispasmodics alone, though it is always indispensable to give them, and though they may render precious services. And besides, a thousand circumstances may interfere with the use of the hygienic means we have mentioned, when the antispasmodics will remain the only resource.

Like that of the majority of the agents whose virtue is wholly superficial, that of the antispasmodics is fleeting. Their effect is perceived quickly or not at all. The fetid gums sometimes form an exception to this law, whence follows the indication to renew their administration often, not to trust in their action unless it is manifested promptly, and (a capital point) not to give them up when one of them fails. This rule is generally true with the substances we are speaking of. Ether does not succeed—give valerian; the latter fails—gives asafœtida; and so on; and you will often find the indication satisfied by the antispasmodic which is usually the least certain. But do not abuse this accommodation if the moments are precious, even if this class of remedies is perfectly indicated. They do not always succeed; they even sometimes aggravate the condition of certain nervous women, and unhappily we have no sign which can inform us of such facts in advance. The distinctions set up by the old school of Montpellier in this respect are insufficient and illusory. In these cases—which, indeed, are the least frequent—we must strike into a new form of treatment; it is of such that Hippocrates said, "Invita Minerva nil quicquam moliendum."

A very general error seems to contract and falsify the treatment of neuroses: it consists in separating them from other classes of disease. When we have said that a disease is nervous, we have immediately the idea of a physiological superexcitation of the nervous system, a disorder

analogous to that which everybody experiences under the effect of transient disturbances of the nerves. And because these disorders are not organic, but very often permit the vital functions to go on and do not threaten death, there is almost a temptation not to consider them as diseases. Much might be said of this error. There is nothing more false than the general opinion of the harmlessness of neuroses. The nutritive functions are influenced by them much more than is thought. The gravity of a disease is hardly ever in its symptoms, or (as we say) in its forms; it lies chiefly in its diathetic or general cause. This is very applicable to the neuroses, whose principle, though it takes this form first, may assume much graver ones and produce cachexiæ or organic lesions. To say that the neuroses are disturbances of sensation and motion without structural lesion, is simply to characterize a genus of affections. But this genus cannot form species of nervous affections unless it is the manifestation of a pathological cause. These internal causes are often the same as those of the phlegmasiæ, the organic lesions, the cachexiæ, and all the diseases which are not called nervous.

Nature breaks the classifications of nosologists. It mingles inflammatory and nervous symptoms in the same general disease, which passes and transforms itself from one to another; while the basis of these morbid determinations—the so-called diathesis—remains identical. These symptoms are combined in infinitely varied proportions, whence result ill-determined affections, more numerous than all the others together, which cannot possibly receive names in our narrow nosographies. The notion of morbid specificity, the basis of nosological species, has been applied to phlegmasiæ, cachexiæ, to organic lesions; but neuroses have not yet been regarded from this point of view. Clinical medicine presents here an inconceivable lacuna. Together with others that we shall name, this lacuna takes away all medical character from the prognosis and treatment of neuroses. For this reason we must finish with a few considerations which are necessary in order to impart reality to antispasmodic treatment.

We have already said, under Tonic Treatment, that when anæmia is morbid or spontaneous, the accompanying neuroses are as much due to its producing cause as to the want of relation between the vascular and the nervous element, which, in the system, represent vegetative and animal actions. There are also persons in whom the nervous system has such strong influences upon the vegetative life that the neuroses exhaust them or prevent repair, as a loss of fluids would do. The neuroses, then, may be a cause of anæmia by themselves. In any case, and in whatever way anæmia is engendered in neuroses, it is certain that it becomes in its turn the condition of an unbridled and infinite multiplication of spasms. Fifteen years ago, our development of this point made a new thing of it—a thing which had its salutary effect in the reaction which seized upon the system of physiological medicine. Practitioners had need of this idea after the fertile crop of nervous disorders which had shot up under the influence of diet and bloodletting. Nevertheless, the foundation of our doctrine of

spasms lies not so much in the capital fact of anæmia and the irregularities of the nervous functions which it may cause, as in the more general theory with which we have connected anæmia.

The dominant idea of our study of antispasmodic treatment is that of placing the origin of all the proper spasms in the visceral nervous system; of deriving these neuroses from the sources of the affective sensations and the passions. This idea, the truth of which we verify daily, sums up all we have said. It will be remembered that we have connected with it the enervating effect of excessive losses of blood and anæmia. If the regularity of the action of the nerves of animal life is rooted in the regularity of the action of the ganglionic nerves, the latter have, in the equilibrium and the healthy energy of the elementary vital actions, one of their chief guaranties of order and regularity. The ancients made health to consist in this fundamental equilibrium, termed by them "good composition, good crasis, encrasia"; they found in it the conditions of physical well-being, of order in the nervous functions, of temperament, and even of character.

All, vitalists and chimiatrists, agreed on this point. The former said that from the blood were generated the animal spirits, healthy and regular if their source was pure and rich, but unhealthy and irregular if it was enfeebled or corrupted. The chimiatrists held the living blood to be an inorganic compound, and made from it, instead of animal spirits, sulphurous, mercurial, crass or subtile, sharp or gentle, cold or hot, explosive or tranquil vapors. The neuroses were only the effect of these vapors in a volcanic state. The word has remained in medical language; it should have been retained only as a simple title of comparison, but it has been otherwise understood by some modern authors.

Under the name of *névrosité* Buchez and Cerise assume that from the blood a fluid is secreted by the nervous substance, which is the agent of all the phenomena of sensibility and movement. Independently of the too close resemblance which this has to the animal spirits of Descartes, this theory has the vice of explaining nothing, and of supporting error as readily as truth. We have recalled it less in order to remark its subtility than to note the constant unanimity of opinion upon the point in question.

It will be in vain to attempt to escape from the Cartesian mechanism, as long as the nervous organs are considered as apparatus destined to draw from the blood a fluid which, under the name of névrosité or any other, produces by its movements the representative and affective phenomena in animals. The least of the defects of these superannuated theories is, that they explain nothing.

The nervous substance enjoys, essentially and by itself, representative and affective sensible properties. These properties are innate. It is composed of them, if we may so speak. It does not draw them immediately from the blood; but, in ordinary circumstances, it requires its reparative and stimulant impression. It assimilates the blood to itself; it does not draw nevrosity (or, its sensible properties) from it, but, on the contrary, commu-

nicates these properties to it. It is certainly necessary that the appropriate elements should be in the blood; but that is a long way from that kind of alchemistic distillation, which will always weigh down those theories which are not founded in the innateness of the sensible properties of the nervous system, which are maintained by the blood, and are excited and determined by external objects, but which are produced by neither.

How can we possibly assign that part to them, when we see that anæmia and solitude so singularly favor the physiological and morbid production of representative and affective phenomena, and make so powerful a condition of all the neuroses? Who does not perceive, in thinking of this single fact, that these little explanations are pregnant with erroneous therapeutical consequences, and can only lead astray in the application of antispasmodics? And yet all these hypotheses attest an important fact which outlives them, and which must be taken seriously into account. The most general and practical idea which corresponds to it is as follows, in paraphrase.

The neuroses are diathetic, like the phlegmasiæ, the cachexiæ, the organic lesions, etc. From this flows one consequence which is founded on the most incontestable clinical observation, namely: that the neuroses, like the phlegmasiæ, have distinctive characteristics which depend not merely upon their seat, the nature of the functions perverted, or the intensity; but as there are rheumatic, gouty, scrofulous, syphilitic, dartrous, typhoid, and a thousand other phlegmasiæ, produced by poisons, so there are neuroses and neuralgiæ of the same species, which ought to take their name, and which as such present the same therapeutical indications, independently of those they present as neuroses. Hence it is necessary to conclude further that the therapeutic indication of spasm is double, one part answering to antispasmodic treatment proper, and the other derived from the nature of the diathetic course of spasm. Thus, in a phlegmasia, if it is intense, whatever be its cause, the antiphlogistics satisfy the immediate and vital indications, while the special remedies satisfy those that are remote and special, that is, the diathetic. Diathesis being nothing but the common pathological element or what might be called "the universal part of a general disease" can manifest itself by all possible disturbances of the special functions. In the physiological order, nutrition, the cardiac and capillary circulation, the secretions, the nervous functions and apparatus, have in common one thing—life in general. In the pathological order, the perversions of these functions, or cachexiæ, phlegmasiæ, fevers, and neuroses, have also their common element. It is, then, as simple to say that the neuroses are diathetic as it is to say that the special functions of the nervous system presuppose life in general and manifest it in their way. One who does not understand that will see neuroses only as a more or less ingenious physiologist, never as a physician.

Two more things must be understood in order to throw light on antispasmodic treatment. The first is, the distinguishing between frank and irregular neuroses; the second, the not confounding simple with complex

neuroses. The frank neuroses are those upon which our antispasmodics most generally act; we have already stated the conditions. We designate as frank neuroses those types which are described in nosologies under the names of hysteria, chorea, hypochondria, epilepsy, etc.

They rarely originate in a definite pathological cause, a special diathesis. Temperament, seconded by circumstances of education, by moral causes and a certain manner of life, almost always suffices to develop them. At a certain age they are seen arising as if spontaneously from the physiological preponderance of the nervous apparatus which is their special seat. For this reason, doubtless, they are the least grave of the neuroses. The best remedies are the antispasmodics as palliatives, a good hygienic course, time, that is nature, by the action of age and the organic changes it brings about.

The neuroses are not frank but irregular when they are decomposed into several partial obstinate affections, proteiform, attacking all the organs, and simulating in them a multitude of divers diseases. When a disease is irregular, there is a reason for it, which the physician should always seek for. He will usually find it in a combination of several affections which reciprocally contradict each other, or make one another unnatural. This is seen in the neuroses. When these maladies are joined with other morbid symptoms usually strange to the neuroses, such as fluxions, congestions, fever, vices of secretion, etc., it is because they are almost always diathetic. The differential cause of the frank and of the irregular neuroses would seem, then, to lie in the condition that the former are not diathetic, and the others are so. The latter must not be confounded with the cases in which a general or diathetic disease coexists with a neurosis, as rheumatism with hysteria. This coexistence may be encountered without the neurosis being rheumatismal. But then it will retain its character as a frank hysteria, and the rheumatism will do the same: there will be nothing but juxtaposition, coincidence, but not an intimate association, a fusion, a crossing of the two affections.

If the pneumatistic theories which we have criticized were true, a cachexy ought not to exist without concomitant neuroses as its symptomatic expression. But it is very often not so: a new proof that the nervous apparatus has an essential activity. Do not the nervous functions persist in strength and regularity in the midst of the profoundest cachexiæ, manifesting neither pain nor paralysis nor spasms, while all the vegetative functions are in a state of disorder and dissolution? A woman with putrid fever, deprived of food, is seen giving to her child abundance of healthy milk. Yet it may, and too often does happen that the sufferings of the sensory system express the changes of the nutritive system. There then occurs in the nervous substance an active pathological conception, and not a passive separation of morbid images and sensations. This wonderful substance may have enough healthy energy to impart it to the altered materials of repair, that is, to persist in its normal state though fed by bad blood. Fortunately, these cases are quite common.

But if the most feeble nervous substance, endowed with the least of healthy properties, or containing morbid properties in relation with those of the blood, conceives the affection of the latter the general disease will show itself by special nervous disorders related with its own.

This discussion is not at all indifferent to antispasmodic treatment. In the old or the new pneumatism, the blood alone must be acted upon in treating neuroses. The chimiatrists also contributed. Under the pretext of fabricating animal spirits or neurosity endowed with such and such qualities, they introduced into the system the strongest drugs and alteratives in doses the dangers of which greatly assisted to produce the homœopathic reaction. These excuses fell away before the discovery of sensibility as a property inherent in the nervous substance; and then a less systematic treatment was entered upon, more mild, more conformable to the nature of things.

The blood globule is sensitive in its way. We act upon it, as upon the nerves properly so called, only by impression. If this truth were fully felt, it would not be treated like an inorganic compound. It is affected in diatheses; and the nervous apparatus, affected by it, can betray by their own phenomena the nature of the general disease.

We have tried to give some of the distinctive characteristics of the special neuroses, generally irregular, and of the frank neuroses; and in this we believe we have rendered a real service to antispasmodic treatment. It must evidently, in these cases, draw its indications and its remedies from two sources, and co-ordinate them according to the predominance of each of the pathological elements. The diffusible stimulants, the agents which produce a very rapid expansive excitation of the vital movements, are generally more useful in diathetic or irregular neuroses than in the frank neuroses. The latter are better suited by the pure antispasmodics, by cold and a proper direction of the ideas and feelings. Moral hygiene has less influence on the diathetic neuroses.

We give the name of *compound neuroses* to those in which the symptoms of two simple neuroses are associated. This is another of the most frequent and the most ignored sources of indeterminate neuroses, in which practice abounds. All or some of the symptoms of two neuroses often exist—hysteria and hypochondria, hysteria and chorea, eclampsia and hysteria, hypochondria, dyspepsia, neuralgia, paralysis, palpitations, etc. These affections are the despair of prognosis and treatment ; from them principally result those indeterminate neuroses which are to-day called proteiform neuropathies, in the hope of replacing, by an easily remembered word, the thing itself, which is so much more important. These complex neuroses are more often diathetic than the irregular ones ; and if febrile, fluxionary, and cachectic phenomena supervene, as is common enough, there result affections which are indecipherable by the modern school, and which practitioners formed in this school confound with inflammatory diseases or organic lesions. They may be distinguished by the disproportion which exists between the intensity of the pseudo-in-

flammatory phenomena, as pain, fever, etc., and the state of the forces and the vital functions; by the mobility of the symptoms, and often by the retention of the patient's natural instincts and functional aptitudes in the midst of the most violent disorders. These are the gouty and rheumatic diatheses, which, manifested abnormally by mixed nervous symptoms belonging to several neuroses such as hysteria, hypochondria, asthma, neuralgia, etc., produce those singular affections, more common than the frank diseases of the nosographer's in private practice, the grave and unusual appearance of which inspire so many erroneous prognoses and false treatments. Antispasmodic treatment claims a great share in mixed neuroses, even under the rheumatoid and pseudo-inflammatory forms. Where, according to a medical system, the most rigid application of bleeding and other antiphlogistics would seem required, one is surprised to see antispasmodics, as valerian, asafœtida, ether, a little opium or belladonna, a camphorated enema, a bath, etc., relieving those compound and diathetic neuroses which simulate the gravest pyrexia and phlegmasia. We cannot avoid presenting these considerations; upon their just appreciation the correct use of antispasmodics depends; and, though they are entirely clinical, they are not to be found in any of our works on pathology.

It is not customary to place mental diseases by the side of the neuroses proper. Cerebral disorder, manifested by disorder of ideas and feelings, has misled the pathologists who have treated this important order of neuroses; and while some saw in them only immediate effects of organic lesions, others studied that imaginary and fruitless science called "psychology," which is limited to a purely external study of man, and which licenses its votaries to be destitute of positive notions of metaphysics and philosophy. But it would be easy to show that insanity is a disease which does not differ from the others in its general laws, and that many forms of vesania originate in a visceral nervous affection. It is true that delirium and intellectual and moral troubles at last assume such importance as to absorb attention and cause to forget the continually active origin and condition of insanity.

There are several varieties of insanity (and the most numerous), which at the beginning present accessory yet unquestionable indications for antispasmodic treatment. Mental alienation, generally affective, may take its origin from a passion. Physiologically, this passion always emanates from the visceral nervous system; but the determining cause may be either moral or purely pathological. Hysterical or hypochondriacal insanity, puerperal mania, etc., may develop independently of any moral cause. But though it be true that, as determined by a pathological or a moral cause, insanity has generally a visceral, that is, affective point of origin, and on this aspect belongs to antispasmodic treatment, it is not equally certain that if the brain resists the perturbing influence and remains sane, the individual will never become insane. Insanity is conceived in the sensorium commune only because it previously contains the morbid ele-

ments of this neurosis: the cerebral trouble is the characteristic, and this trouble demands either an encephalon specially disposed, or else that the moral or pathological cause, if it is accidental, shall have affected simultaneously both parts of the nervous system, to wit, the seat of the affections, and that of sensory presentations.

Old medicine treated insanity like other diseases; with the exception of forcible measures, it used only drugs. In the new or psychological method, this exclusive way has been systematically abandoned, and we hear of nothing but moral treatment. It is true that this treatment very often consists in cold douches upon the nose, and acts on the morale of the obstinate insane patient only as blows with a stick act on the moral nature of a refractory dog. Without denying that moral treatment ought to hold the first place in the treatment of insanity, we think that the resources of ordinary medicine have been too much neglected.

The very vicious scholastic habit of instruction which consists in subordinating the study of therapeutics to that of materia medica, and which obliges us to speak of diseases under remedies, instead of doing the opposite, would impose on us the rule of never introducing into any subject (as that of antispasmodic treatment) the idea of any other agents than antispasmodics properly so called. We have made it a rule to violate this absurd custom, and always to pay much more attention to the truth and the interest of practitioners than to the demands of routine. Thus insanity has its antispasmodic treatment; and, though it does not derive all its remedies from the order of antispasmodics, it nevertheless possesses, as a neurosis, its place in this chapter of our book. Cold, opium, belladonna, and among our antispasmodics camphor and musk, as acting more on the brain than the other remedies of the same order, are the most desirable remedies in insanity. We do not see why they should not be associated with moral treatment and bodily hygiene in insanity. It seems easier to be systematic, and to shut one's self up in one or the other method exclusively.

At a certain stage of insanity it becomes purely cerebral, and is no longer animated by the passional influences of the visceral nerves. From mania the patient passes to dementia. This state is only an incurable incoherence in the intracerebral actions. From this moment, antispasmodic treatment has nothing more to do with insanity. The condition for its use has departed with the visceral or affective element of the neurosis.

To sum up our views—the mental disorders are composed of several elements, the initial one of which may present formal indications for all forms of treatment, especially the antiphlogistic, as in cases of acute phlogosis of the abdominal viscera with superexcitation of the ganglionic nervous system; and next, for the sedative, the temperament, and the antispasmodic. While this affective period lasts, it is right to try the effect of the antispasmodics indicated, and not to abandon their use (together with that of cold and the other sedatives) until the mental trouble has become predominant in the brain, and the neurosis has concentrated itself there, abandoning the affective centres.

It is remarkable that all antispasmodics have an aromatic odor, diffusive and penetrating, sweet or fetid. The analysis of the immediate effects experienced by a healthy nervous person is adapted to throw light upon their manner of acting in spasmodic affections, and, consequently, upon the seat of the initial symptoms.

In one of those moments of nervous distress and oppression when precordial anxiety forces the cerebral imagination to adapt itself to the painful disposition of the cerebral nerves, let one inhale forcibly an aromatic substance, as a lemon squeezed between the fingers, so as to force out its oil, or a leaf of balm, or a bottle of ether, etc.; the emanation will be felt penetrating by the olfactory sense to the sensorium commune of the vital sense, which the first philosophers and the most ancient physicians placed under the diaphragm. A sense of comfort will diffuse itself there. The hypochondriacal anxiety will be dissipated in its source, and there will be communicated to the brain a sort of beneficent *vapor* which will calm the sensible imagination. From this observation has originated the word vapor, an old synonym of nervous troubles, because vapors formed by the impure means of the viscera were thought to be the cause of the vital malaise and melancholy which rise with suffocation from the stomach toward the seat of thought and sensation. Such is the order of succession of the phenomena in that experience which is repeated daily under the influence of agreeable or painful emotions. This fact, so simple and habitual that we pay it no attention, includes and sums up all our theory of the spasmodic affections and the remedies which act upon these affections through essentially antispasmodic acts. Some of these agents are sweet-scented, some fetid or repulsive. Certain ones produce spasms in certain persons. Do they, therefore, act by the homœopathic law of *similia similibus?* No; for this effect is not general. Besides, if the homœopathic law is exact and absolute, it is in this class of persons that the antispasmodics ought to act most efficiently, whereas the contrary is generally the case. In order that a remedy be direct, it is not necessary that it act by the law of contraries, but that it produce its effects immediately at the place where the disease produces its own. But is the action produced according to the law of contraries or likes? This is relative, for it varies. Our antispasmodic remedies act immediately, as we have proved, at the very point where the spasms act; and this is enough to constitute them a class apart, which justly retains the name of *Antispasmodics.*

CHAPTER XI.

NEUROSTHENIC TONICS.

Cinchona.

Intermittent fevers.—If any action is demonstrated in therapeutics, it is that of cinchona in intermittent fevers. We will not, therefore, discuss a fact which is now irrefragable; we will only study the different modes of administration of cinchona in these fevers.

Should cinchona be given before, during, or after the access?

In what dose should it be given?

At what intervals should the doses be repeated: 1, for cure; 2, for prevention?

By what channels should it be administered?

What modifications should our rules undergo, according to the nature, the character of the intermittent fever, or the place where it is contracted? Does it require previous treatment, and what is the influence of that treatment?

A. *Should cinchona be given before, during, or after the attack?*

The Roman method, the first that was known in Europe, and which had been taught by the Jesuits of Lima to those of Rome, directed that it should be given immediately after the attack. If the fever was double tertian, the remedy was given at the beginning of the most violent attack, in order the more surely to destroy the paroxysm of the day following, which is naturally more feeble. This method was generally adopted in Italy; it was the one which Torti received from his master, and which he followed in ordinary intermittent fevers ("Therap. specialis," cap. VIII.).

Sydenham, on the contrary, ordered to begin by giving cinchona at the end of the attack, and never at the beginning, and every four hours he gave a new dose until the presumed hour of the following attack.

This method, called the English method—which Torti did not object to, though he would not follow it—was loudly proclaimed by Sydenham, who appropriated it and explained the inconveniences that attended the administration at the beginning of a paroxysm. Morton followed Sydenham in this point.

Cullen, in his "Materia Medica," returned to the views of Torti, and sustained them obstinately; but Bretonneau, of Tours, made comparative trial of these different methods and placed himself fully on the side of Sydenham. He saw, as Sydenham had plainly indicated, that if the

remedy was given just before the paroxysm, it was often vomited; Torti also admitted this, and consented to give it after the attack in some cases. "Exhibendo videlicet drachmas duas chinachinæ, invadente paroxysmo, vel, si mavis, eodem declinante; siquidem in principio accessionis metus est, ne vomitu, tunc temporis, facile rejiciatur (Torti: "Therap. spec.," cap. VII., p. 58). He found that the access was more violent and more painful when cinchona was given before it; that the following access was, nevertheless, suppressed or singularly weakened; that in addition, the successful result was obtained quite as certainly when the bark was taken immediately after the attack; that in consequence there was only inconvenience, and no advantage, in following the mode adopted by Torti. We shall see hereafter how, in the treatment of pernicious fevers, it is desirable to depart from this rule.

Bretonneau, following Sydenham, formulated his practice in these words: "Give cinchona as far as possible from the coming access" (*Jour. des connaiss méd.-chirurg.*, t. I., p. 135).

The reason for this precept is very simple. Cinchona does not act by a volatile and diffusible principle which, absorbed directly, is placed rapidly in contact with all the tissues of the system; its active principle is absorbed quite slowly, and it requires a certain time in order to produce a powerful effect. This time, when the dose is of ordinary size, is at least from eighteen to twenty-four hours. If the dose is larger, from six to twelve hours suffice. If cinchona is given at the beginning of the attack, what is gained? The suppression of that attack? This is impossible. To suppress the next one? But why let the patient have one attack more, when by giving the febrifuge as soon as the preceding one ended we had time enough for the cinchona to be absorbed?

Sulphate of quinia does not need to be given so long before the access as cinchona; but an attack will never be arrested, even by sulphate of quinia, as surely as if the drug were given a very long time before the invasion.

B. *In what doses should it be given?*

Sydenham and Morton gave it in its natural form or incorporated with an opiate; but they used small doses, repeated several times a day and continued for a certain time. But Torti, who followed the Roman method, ordered it to be given in one large dose, judging that he thus obtained much more than by subdividing and distributing over several days a much larger amount.

"Six scruples of powdered cinchona taken successively in the space of six days, though equal in weight to 2 drachms, are very far from having the same activity as 2 drachms taken in one dose. This is of a capital practical importance. It follows that with 24 or 30 grammes (3 vi.—viii.) of cinchona one physician will cure an intermittent fever which has lasted long, and will even prevent its return, while another will not attain his end with 3 or 4 ounces. The former will give 8 grammes at the first dose, which will suppress the access at once; then after an interval of one or

two days he gives 4 grammes more at a dose (ʒ i.), and as much the next day; then he leaves an interval of almost a week, and for a week he gives 2 grammes daily; in this way he prevents all relapse; the second, on the contrary, does not cure by giving 1 scruple daily, and using in all 3 ounces of cinchona" (l. c., p. 55).

"Twelve, and even 8 grammes of royal yellow cinchona usually suffice to suppress an attack of legitimate intermittent fever; *but this dose must be given at once.* The same quantity broken up produces not the same effect. Sixty grammes (℥ ii.) of the same cinchona have been given in the space of five or six days, in the intervals of fever, without suppressing the latter, while 15 grammes (ʒ ss.), given in one dose, had the usual results" (*Journ. des connaiss. méd.-chirurg.*, t. I., p. 135). But we need not understand this precept of Torti and Bretonneau according to the letter. We have often heard the latter explain what he meant by a *single dose;* it is, that the prescribed quantity should be given within a short time, one, two, or at most three hours; for it is evident that there are patients who would not readily bear to swallow at once 15 grammes of the powder. This is also applicable to sulphate of quinia.

We will say, by way of formula, that *cinchona should be given in the quantity of* 8—15 *grammes* (ʒ ii.—iv.) *in one dose or at very short intervals.*

Most physicians, in giving cinchona or sulphate of quinia, refuse to adopt the mode advised by Torti and Bretonneau. They cured the fever, beyond a doubt, but at more expense and inconvenience than the others.

C. *At what intervals should the doses be repeated in order to cure or prevent the fever?*

We have seen that cinchona must always be given at first in a non-febrile interval, as far as possible from the coming access, that is, at the end of a paroxysm; also, that a large dose should be given in order to suppress the access.

Without doubt (and we have seen a thousand examples), when cinchona is given at suitable times and in fit doses, the following access is suppressed; but it is not so perfectly done that the patient does not perceive some slight reminders; such as an increased heat accompanied by malaise, or, as is much more common, abundant sweats which recover on the days for the access. The fever is not then really cured, and if the remedy is abruptly stopped, the attacks soon return, at first weak and less marked, but soon with the clearest and most positive signs, whence the admirable precept, stated by Torti in the passage we just gave, a precept which he had from his masters and from the Roman physicians who had first given cinchona. This method was adopted by Sydenham, who in his works reproduced it with so much emphasis and supported it with so many practical reasons that it took the name of this great man, and was known to all the writers of the last century as Sydenham's method. Sydenham thought that the relapse was due to the fact that the blood was not enough saturated with the remedy; to prevent this, he saw that a new

dose must be given before the influence of the former one had entirely passed off. "Recidiva ex eo videbatur nosci, quod sanguis non saturaretur virtute febrifugi, quod utut efficaxa, una tamen vice morbo penitus exterminando par non fuit; idcirco œstimabam nihil ad eam præcavendam æque posse conducere atque methodum repetendi pulveris, etiam devicto ad præsens morbo, justis semper intervallis, antequam scilicet vires præcedentis dosis prorsus elanguescerent" ("Epist. ad Rob. Brady").

Sydenham insists further. He specifies with the minuteness of good practitioners, who never think that one detail can be in excess. "If," says he, "I am called on Monday to a patient with quartan fever, and the access is expected on the same day, I do nothing; I only give him hope of the cure of the next access. Then, during two days of intermission, to wit: Tuesday and Wednesday, I give every four hours a dose according to the following formula: Powdered cinchona, 1 ounce; syrup of rose or œillet, a quantity sufficient for an electuary, which is divided into twelve doses (each containing 2½ grammes of cinchona). The patient takes one of these every four hours, from just after the access, and a little wine after it. In place of the electuary, wine of cinchona may be given, prepared with 1 ounce of the bark to a quart of red wine. The dose is nine spoonfuls (℥ iii.—v.) every four hours. Thursday, the presumed day of the access, nothing is taken; and the cinchona has been already used up. But to avoid relapses, on the eighth day, just after the last dose, I recommence in exactly the same way, and though in general this double treatment suffices to destroy the fever, still the patient will not be sure unless the physician returns to the same treatment a third and a fourth time.

"The same method succeeds in tertian and quotidian fevers. I attack them immediately at the end of the paroxysm; I pursue them by the administration of the remedy at the intervals indicated, but with the difference that if, between two attacks of quartan, it is necessary to distribute one ounce of cinchona, 6 drachms will suffice in tertian and quotidian fevers."

The method adopted by Torti, as may be seen, hardly differs from Sydenham's. Stoll and Van Swieten knew the practical utility of the advice of the English Hippocrates, and in our time Bretonneau has proved the excellence of the method by new experiments.

Let us try to sum up briefly the various modes of curing fever. They are reducible to three:

Method of Torti—Roman.
Method of Sydenham—English.
Method of Bretonneau—French.

Method of Torti.—Eight grammes (℥ ii.) of cinchona in one dose, either just before the attack or at its decline. One or two days of interval; then two days successively, 4 grammes at one time. A week of rest, then 2 grammes for a week continuously.

Sydenham's, or the English method.—Thirty grammes (℥ i.) or 24

grammes (3 vi.) of powdered cinchona, distributed in doses of 2½ grammes (gr. 40), every four hours, beginning at the close of the access. A week after the beginning of the treatment the same must be resumed, and returned to twice more, at the same intervals and in exactly the same way.

In giving sulphate of quinia, we use 3 grammes (gr. 45) distributed in doses of 15 centigrammes (gr. 2·3) every four hours.

Bretonneau's, or the French method.—Cinchona, 8 grammes (3 ii.), or sulphate of quinia, 1 gramme (gr. 15), in one dose, or in two doses at very short intervals, as far as possible from the coming access; five days of interval, then the same dose; a week of interval, the same dose; and from week to week the same dose for a month. If the fever has lasted long he continues, but may still raise the doses; he then places successive intervals of ten, fifteen, twenty, twenty-five, and thirty days, and in this way prevents the attacks with certainty, which was by no means equally the case when Sydenham's method was strictly observed

Bretonneau's method as modified by Trousseau.—During three years which we passed in the hospital at Tours following Bretonneau's clinic, we only once saw this method fail to cure an intermittent fever; but since we were at the head of a department of a hospital in Paris, we have quite often failed, though using exactly the formulæ of our illustrious master, to cut off perfectly legitimate cases. The first attack which followed the administration of cinchona was postponed, singularly attenuated, and sometimes even suppressed; but the second, or at least the third, reappeared, more or less modified. This was a serious difficulty, which we met in the following way:

Immediately after the attack, 8 grammes (3 ii.) of calisaya bark, or 1 gramme (gr. xv.) of good sulphate of quinia. One day of interval; the same dose; four days of interval; the same dose. The rest according to Bretonneau's method.

The method of the physician of Tours very rarely fails when the fevers have not lasted very long, and especially when the improper use of cinchona has not made the system insensible to the action of the precious remedy; but when the patient has had many relapses of the fever, when he has already taken sulphate of quinia or cinchona, we must return to the method indicated, if we wish to make a speedy end, or better still, to Sydenham's method, observing rigorously the doses which he ordered.

We desire to make here an important remark, which will set in a clearer light the excellence of the method of Sydenham and Bretonneau. If, after the most appropriate use of cinchona, we abruptly cease to give it, the fever returns, and then we have to open a new account exactly as at first.

The advantages of the method of Sydenham and Bretonneau are first, that they are certainly more curative than the others; but it is also exempt from some grave objections, to which we must call attention.

When, by other methods, a small dose is given daily, the fever is modified, and sometimes cured, but with more difficulty and less certainty;

sharp pains of the stomach soon appear, whatever be the mode of administration. If, then, the fever reappears, it can no longer be cured. But if powerful doses are repeated every day and continued a long time, besides the pains of the stomach, there appears a sort of fever, clearly described by Bretonneau, which presents an intermittent type when cinchona is given in an intermittent manner. This fever is a sort of vicious circle which very often involves inexperienced physicians, ignorant of the action of cinchona; they redouble the doses, and bring on a condition which may be very severe.

Another inconvenience results from habituation. The patient, by taking cinchona, at last becomes insensible to its influence, and the fever recurs in spite of the daily doses. The method of Sydenham avoids this disadvantage.

Among the troubles ascribed to cinchona there are some which certainly do not belong to it: we refer to engorgement of the spleen. From the first discovery of Peruvian bark, this was one of the chief grievances charged against it, and in our time there are still those who renew the old complaint. The question is rather complex, for this reason: when the fever has lasted a good while, patients have usually taken cinchona; the spleen in this case is always engorged; must this disorder be ascribed to the disease or to the remedy? The true way of answering the question would be to find persons, in fever-smitten lands, who have never taken cinchona and have had the fever six months; their spleen will be found almost invariably hypertrophied, and this engorgement may even be demonstrated by percussion after five or six attacks; Bailly of Blois has often recognized it at the autopsy of patients dead of pernicious intermittent, who had not taken cinchona. It is also easy to ascertain that the spleen retains its normal volume in those who have often used cinchona for a neuralgic or other affection.

The method of Sydenham should be modified for pernicious fevers, although it be preferable in all respects for simple cases.

Mercatus, as admitted by Torti himself, first well described pernicious fever, but he did not treat it successfully. Sydenham had seen some cases, and had mentioned the advantages of cinchona; Morton formulated the benefits more precisely, but did not indicate a method which would almost always be successful. To Torti is due the credit of fixing the treatment. He first showed that Morton's method, which consists in giving every three or four hours 4 grammes (ʒ i.) of cinchona, was vicious in all respects, unless there were a pernicious quartan with long interval; but when the fever is tertian, subintrant, or only remittent, as often happens, it is evident that so mild a method is not suitable.

He first saw that it was necessary to give the curing access by quickness, and for this reason used a dose three or four times as large as that usually given. He gave at once from 15 to 24 grammes (ʒ iv.—vi.) of cinchona. But it is necessary (he says) that the remedy should be given at least twelve hours before the next attack, and as far from it as possi-

ble. "Siquidem necesse est bonam quantitatem intra breve tempus hausisse, et hausisse longe ante horam, quantum fieri potest, futuri paroxysmi" (Torti: "Ther. spec.," lib. III., cap. III.). He gave cinchona, not at the moment of intermission, for a complete intermission often does not occur in these fevers, but at a time when the symptoms of the preceding paroxysm were beginning to lessen a little; in a word, at the beginning of the remission.

This method, infinitely superior to that of Morton, has some disadvantages. It must be acknowledged that, in pernicious, subintrant tertians, the interval of remission is often too short to permit cinchona to be absorbed and act to advantage.

Bretonneau modified Torti's method by beginning to give cinchona at the middle of the paroxysm, and as soon as he had established its pernicious character. In this way he saved at least the twenty-four or thirty-six hours preceding the access, and always was in time to prevent it. He was not alarmed at the idea of increasing the intensity of the attack during which the drug was given, for he knew from experience that it does not act until several hours after it is taken. As he had before him a pretty long period of time, he was not forced to give at once a dose as large as that of Torti; he gave at first 12 grammes (3 iii.) and repeated this quantity every three hours, until the patient had swallowed 36 grammes (3 ix.) of powdered cinchona.

The method of Bretonneau is certainly the most practical and effective, and we do not hesitate to place it above that of Torti, of which it is only a modification.

As soon as the pernicious attack has been suppressed or much weakened, it is no longer necessary to give these large doses. But it would be well to give for some days 8—12 grammes (3 ii.—iii.), and afterward to resume Sydenham's method as modified by us.

Let us pause for a moment to consider a question which has received much attention from our predecessors, and deserves to have ours also. It is as follows: "How long after the beginning of the fever ought we to give cinchona?"

Hippocrates said: "Tertiana exquisita quinque aut septem periodis ad summum judicatur" ("Aph.," 5, sect. 9). "Judicatur ad summum nono" ("Coac." 148). This statement is far from the truth, but it has controlled the practice of the schools, and, in the hope of seeing the disease come to a spontaneous crisis, they waited until the seventh attack, for fear of disturbing the salutary efforts of nature. The anticipations of the Father of Medicine were no doubt often realized in vernal intermittents, but in the autumn tertians his crisis was in vain expected.

The divine old man himself did not so respect the operation of nature as to forbid absolutely all medical intervention before the seventh access; very far from that, we find him advising purges after the third attack: "Cum tertiana febris detinuerit, siquidem impurgatus æger tibi videatur, quarto die medicamentum purgans exhibeto" ("Lib. de affect.").

Boerhaave also insists on the necessity of giving cinchona only when the fever has already lasted a certain time, "Morbus jam aliquo tempore duravit" ("Aphor.," 767, t. II., p. 508). And Van Swieten, his commentator, improves on his master's dictum: "Maximi momenti hæc regula est qua neglecta, mors quandoque, sæpius autem dira et anomala penitus symptomata sicuta fuerunt, ipsa corte longe pejora (ibid., p. 511). Sydenham was no less explicit: "Curandum est ante omnia, ne præmature nimis hic cortex ingeratur, ante scilicet quam morbus suo se marte aliquantis per protriverit" ("Op. omn.," sect. I., cap. V., p. 112). There are few practitioners who appreciate the justice of the precept of Boerhaave and his commentator; but it is essential to study and understand its motives.

Many continued fevers begin with accesses which simulate a legitimate double tertian, rarely a tertian, never a quartan. This may be observed in all climates, in all seasons, but is a very common fact in countries where the intermittents are endemic, and especially in the autumn. If, then, a latent pleurisy, a deep and obscure phlegmasia, a dothinenteritis, take at their onset a tertian or double tertian intermittent type, it is very plain that the symptoms will be generally aggravated by cinchona, and then the remedy will be blamed, whereas the physician has committed an error of diagnosis in taking a phlegmasia, or pyrexia with intermittent symptoms, for a legitimate intermittent. This was fully seen by Boerhaave, who thus completes the aphorism we were quoting from: "Si autem febris autumnalis vehemens. . . . . morbus jam aliquo tempore duravit, neque signa adsint internæ inflammationis, neque collecti alicubi puris, neque obstructi admodum hujus illiusve visceris, cortice peruviano abigetur," etc. The physician ought, then, at the beginning of an intermittent, to ascertain whether the fever is symptomatic of any visceral lesion; and if from examination and from the patient's antecedents he is assured that the fever is legitimately intermittent, he may, without waiting for Hippocrates' seven attacks, begin at once, and always with advantage. But as error is always possible, even with the most attentive physician, it will be prudent to wait, if there supervene no pernicious symptom.

There is also a precious sign for distinguishing, at the beginning of fevers, whether the disease is symptomatic or essential.

The sign is taken from the comparative examination of the paroxysms. When a legitimate intermittent commences, the pyrexia is very often not perfectly cut off in the six or seven first days, and the fever, rather remittent than intermittent, seems to be symptomatic of a visceral trouble; but it is remarked that the remission becomes more and more distinct, that the beginning of each is indicated by a more and more powerful chill, so that by the fourth or fifth access there remains no doubt. And on the contrary, in symptomatic fever, it is not rare to see at the beginning a complete intermission, which changes, as the disease goes on, to remission, while the chills become shorter and at last wholly disappear before the end of the first week; so that in brief we may say: that which distinguishes

simple intermittent fevers at their outset from the symptomatic kind, is that the former, as it goes on, assumes more clearly the intermittent character, while the latter loses it.

We have practised for some time in marshy countries, where intermittents were endemic, and were able there to convince ourselves of a leading fact in the medical history of cinchona, to wit, that for a period which sometimes is quite long, one, two, or three months, a patient may have an almost continuous affection which presents almost nothing to note but nearly regular exacerbations, and this may yield completely to cinchona. In the same regions we find those suffering with chronic pleurisy, for example, in whom the fever takes the most distinct tertian or double tertian type, and the sulphate of quinia, far from curing such a state, usually aggravates it.

It is not true, then, that cinchona is solely an antiperiodic, but that it is the remedy most fitted to cure the state of the system of those who are exposed to marshy emanations. As this state is almost always accompanied by periodic symptoms, cinchona destroys the cause, and therefore the periodicity itself; but if the latter is not due to this cause, cinchona often fails. This explains the many failures daily encountered in the treatment of a multitude of affections which, though periodic, evidently cannot be connected with the ordinary causes of intermittent fever. This question shall be fully treated in the chapter on Tonic Treatment.

Channels for the introduction of cinchona.—It may be given by the mouth, the rectum, or by the endermic or hypodermic method.

The most common way is by the mouth, but in some cases this must be abandoned. Some patients cannot swallow cinchona; others vomit it as soon as swallowed. Little children sometimes refuse to take such bitter stuff. In certain pernicious fevers, the cardialgia, the cholerine, the vomiting which characterize the disease sometimes prevent the use of the smallest dose.

There are also cases where the administration by the mouth must be abandoned: as when, having been long given in this way, it has caused a gastritis or a violent gastralgia.

Another way must then be found, and that by the rectum is the easiest. The doses given by the rectum should be a little smaller than those in injection, because the absorption takes place quicker and better from the large intestines than from the stomach. But if the rectum retains cinchona badly, the doses must be removed so as to get as much absorbed as possible.

Vinous cataplasms of powder of cinchona are used with much advantage by patients who cannot endure the remedy by enema or in a draught. The cataplasms should be large, and kept in place eight or ten hours. They are put upon the stomach, previously well soaped.

Absorption is not always sufficiently active when the epidermis is in place. Lembert has pointed out a new way of introducing remedies through the skin deprived of its epidermis. Cinchona in substance can hardly be given in this way, but the sulphate of quinia may be used, with

as much certainty as if it were given by the mouth or rectum. Ointment of sulphate of quinia has sometimes been very useful when applied to certain regions of the skin where absorption is easy, especially the axilla. Rosenstein has given another indirect method; when an infant at the breast has intermittent fever, cinchona may be given to the nurse. A remarkable case of this form of administration may be found in the *Journal de médecine de Vandermonde* (t. XXXV., p. 415).

Sulphate of quinia generally fulfils all the indications of cinchona as a febrifuge; but not as a tonic.

The febrifuge virtues of the salt cannot be questioned; they are as evident as those of cinchona itself; but it is much more irritant than the bark, both on account of its great solubility and because it has not the corrective which exists in the bark, namely tannin. It causes chronic gastritis and diarrhœa much oftener than cinchona. But these troubles are averted by adding certain substances, of which we shall speak later. In simple intermittents, and still more in the pernicious form, the ease with which sulphate of quinia can be given and its extreme activity give it a certain advantage over cinchona.

Chemical analysis usually gives 3 per cent. of sulphate of quinia in yellow bark. It follows that if we give a dose proportioned to the quantity of bark which cures, we must give as many times 12 centigrammes (gr. 1·8) as we formerly gave drachms. It would follow that we could cure an intermittent with 25 centigrammes (gr. 4) of sulphate of quinia as surely as with 8 grammes of yellow bark in powder (℥ ii.); but this is not confirmed by experience. We have compared (and Bretonneau did the same) the effect of these respective quantities. Eight grammes of bark are a very effective febrifuge, while, to produce the same result 75 centigrammes to 1 gramme (gr. 12—15) are required, which is equivalent to 32 grammes of yellow bark in powder.

To what is this disagreement due? Probably to the fact that quinia is not the only febrifuge element in the bark; perhaps because the sulphate of quinia, passing quickly off by the urine, does not exercise the same influence upon the system as cinchona, which is more slowly absorbed and more difficult to get rid of.

Let us wish with all our heart for the time when physicians, especially those who practise in the country, or among the poor, will see the necessity of using the bark, which, in a curative dose, costs but a quarter as much as the sulphate.

The difficulty of introducing the bark is not very great. Sulphate of quinia is often given dissolved in a vehicle; a very prompt effect is obtained, but the remedy is more disagreeable to swallow than cinchona mixed with water and wine.

By mixing the powdered bark with a little syrup a soft paste is made, of the consistency of an electuary, which is reduced to boluses and swallowed in a wafer. The sulphate of quinia has here no advantages except its smaller bulk.

In our hospital we give it usually, and in private practice almost exclusively, in powder. By adding infusion of hot sweetened coffee, the powder loses its bitter taste, and children take it without repugnance, even with pleasure. For adults we do the same, and we cannot say too loudly how easily cinchona is borne, when thus given, and how inferior the sulphate of quinia is in this respect. It loses almost entirely its bitter taste when dissolved in the coffee, but it retains its other disadvantages.

Pelletier and Coventon have praised sulphate of quinia from the first to the exclusion of all other preparations, and the salt has remained in sole possession of the place of cinchona, in the treatment of fevers; but all the evidence shows that it is very inferior to quinium and to crude quinine, for the following reasons.

Crude quinia differs from pure quinia precipitated from the sulphate only in containing in addition cinchonia and some extractive coloring matters. It differs little from the remedy introduced by Delondre and A. Labarraque under the name of quinium. Quinium and crude quinia are as active febrifuges as the sulphate; they have certain other advantages, namely, 1, they are almost tasteless, while sulphate of quinia is extremely bitter. This insipidity is very valuable in the treatment of children; 2, they have a resinous consistency, and soften with the heat of the fingers, so that they can be made into extremely small pills, which are put into children's soup and are swallowed without difficulty.

The insipidity of crude quinia and quinium, and their consequent insolubility in saliva, are not an obstacle to their absorption by the stomach. They find in the stomach acids which dissolve them at once, and are then absorbed as easily as the sulphate.

If it is thought necessary to dissolve them in a draught or enema, a few drops of acetic or sulphuric acid may be added.

Pure quinia is obtained by precipitation from the sulphate by ammonia, is much more expensive and quite as bitter, and has none of the advantages attributed by us to crude quinia. It is given in doses a little smaller than sulphate of quinia and crude quinia.

There is also extracted from the bark *cinchonia*, pure, or in the form of sulphate. This substance is proved by the most recent experiments to possess evident febrifuge powers, like quinia; it is given in doses twice as large, and its effects are the same.

We must not omit to speak of the alcoholic extract of yellow bark, which we do not hesitate to place above the preparations of quinia, and which must be given in twice the dose of the sulphate. We may say the same of quinium.

Cinchona, quinium, crude quinia, sulphate of quinia, and the extract of cinchona flava, not only cure intermittent fever, but also readily prevent it. We have seen persons without color, with a considerable swelling of the spleen, who for several years had had intermittent fevers, but who remained with impunity in the midst of marsh emanations by taking

the precaution to take every eight or ten days 40 centigrammes (gr. vi.) of sulphate of quinia in one dose.

Our military surgeons, who often have to treat intermittents in Africa, Italy, Cochin China, and other hot countries, proceed in the following general way:

Simple intermittent and remittent fevers.—First, the patient takes an emetic of ipecac without antimony. This indication is especially formal if intoxication is impending and the season warm. In quotidian fevers, the emetic is given just after the paroxysm, and in five or six hours more the administration of sulphate of quinia is commenced. From 0·50 to 0·80 grammes (gr. 7½—12) is given in one or more doses, so that the last dose is taken a week before the presumed moment of fever. It is best in this case to use the acid draught, which allows of a more rapid and complete absorption of the remedy. If the fever is tertian, the potion may be given only every other day, or at the intervals which we gave for the administration of cinchona.

In intermittent fevers, especially in the warm season, and when it is feared that the disease will have a rapid course and turn to the pernicious variety, we must not wait, but give as soon as possible, even at the height of the attack, about 1 gramme (gr. 15) of sulphate of quinia. In the continued forms the indication is still more pressing.

When the fever is broken, it is advantageous to stop the sulphate of quinia and use cinchona under the form above indicated.

Pernicious fevers.—Give the patient at once 2 or 3 grammes of sulphate of quinia, in draught, or enema if the draught cannot be borne, and continue five or six days at once, even if the symptoms are checked. When the danger is entirely past, give cinchona in preference; 8 grammes every week in the morning, for two months.

Theory.—A great many hypotheses have been invented to explain this wonderful effect of sulphate of quinia on the system in intermittent fever; but the problem is still far from being solved. We shall not recall all these hypotheses, but we must say something of certain recent experiments.

For fifteen years a theory has reigned in Italy, due to Polli, which regards paludal intoxication as a fermentation. This theory has led to the search among the antizymotics for new antiseptics to take the place of cinchona; and at the same time it was said that cinchona acted only as an antizymotic.

This theory was taken up in Germany by C. Binz, who showed by very curious experiments that sulphate of quinia arrests the decomposition of vegetable juices in the open air, not only by its toxic action upon the lower organisms, which abound in those substances—amœba diffluens, euglena viridis, vorticella campanula, etc. (C. Binz: "Ueber die Einwirkung des Chinin auf protoplasmabewegungen," in *Schultze's Archiv*, vol. III., 1867). These experiments have been reported with detail and very critically by J. Colin, Professor at the Val-de-Grâce (*Bull. de thérap.*, 15 et 30 juillet, 1872), and Briquet (ib. 1872, II., 289).

We agree with these gentlemen that these very curious experiments may throw some light upon the theory of marsh fever and the action of quinia, but that it is impossible to prove a satisfactory theory in a scientific manner.

Masked fevers—Neuralgias.—If the miasm of the fever gives rise to a febrile affection in which no organ except the spleen seems to be affected, the fever is called simple; if it manifests itself by a local lesion which begins, develops, and ends with the paroxysm, the fever is called masked, because it has taken the form of another disease; and if it attacks an organ essential to life, as the nervous centres, the heart or lungs, or gives rise to disorders so grave as to become a possible cause of death, it is called pernicious. In either case, it is always cured by the same remedy, cinchona. There is no more than a question of diagnosis here.

Masked fever usually affects the neuralgic character, and in this case it is readily cured by sulphate of quinia; but all neuralgias are not masked fever.

In speaking of the therapeutic use of iron, we pointed out the neuralgias as one of the most common accidents of chlorosis, and we saw that iron, in curing the latter, cured neuralgia more effectually than any other remedy, because it prevented the return. We showed also that in combating the pain it was usually necessary to use means which had an immediate result, for otherwise the patient might suffer several months before the fundamental affection was cured. So also the miasma which produces the fever causes neuralgias which hardly differ, at least externally, from those which must be referred to chlorosis.

Non-febrile rheumatism ordinarily affects the nervous branches; and here also the disease differs from masked neuralgic intermittent fever and chlorotic neuralgia only in a few external points.

As for the other forms of neuralgia, this is not the place to speak of them.

Whatever be the cause of neuralgia when it is frankly intermittent, and the intermittence, at first equivocal, is become more and more marked, it must be attacked with cinchona; but the doses should not be the same as in a simple fever, but twice or thrice as great, and given more frequently. To judge of the influence of the febrifuge upon neuralgias, not less than 20 to 24 grammes (3 v.—vi.) of cinchona, or 1—1½ grammes (gr. 15—22) of quinia, taken several days in succession, are required.

There are neuralgias (we have often encountered them) which, while irregular in type, almost continuous, and manifesting themselves four or five times a day by unequal and unexpected paroxysms, are modified under the influence of quinia more easily than those of the most regular type.

Certain persons, especially women, have vague neuralgias which wander with singular facility from the nerves of organic life to those of animal life. In these cases cinchona, and especially large doses of sulphate of quinia, associated or not with essence of turpentine, render incontestable services.

Opium associated with cinchona, and especially with the salts of quinia, is a very useful auxiliary, which advantageously seconds the sedative action of these salts, and which also permits the dose to be very much diminished.

Experience also shows that, of all neuralgias, those of the face and neck are more easily cured by cinchona than those of the limbs—as sciatica; yet sciatica is sometimes benefited by Peruvian bark, even when it does not take the intermittent type. Hence the precept which we have often given in our clinical lectures, to try cinchona in neuralgias, whatever their seat or type. This treatment cannot have any inconveniences, and its frequent usefulness makes it a duty to try it.

Nevertheless, neuralgia of rheumatic origin is perhaps that which is usually most benefited by cinchona. Rheumatic neuralgias of the face are the easiest of all to cure; two pills of 15 centigrammes (gr. 2.2) per day usually suffice. If the neuralgia returns at a fixed hour, give the remedy six hours before the attack.

Where neuralgia returns under the form of hemicrania and seems connected with menstruation, much benefit is gained from a pill, taken every evening, containing 10 centigrammes of sulphate of quinia and 5 of powdered leaves of digitalis (gr. $1\frac{1}{2}$, $\frac{3}{4}$).

There is a form of catarrhal fever, in which the neuralgia attacks the pharynx chiefly, and is subject to sulphate of quinia (Marrotte: "Febrinévralgies de l'isthme du gosier et du pharynx simulant des angines inflammatoires," *Bulletin de thérapeutique*, 1874, II., p. 97).

We wish to speak of a form of masked intermittent fever which, through its gravity, its frequency, and especially the obscurity of its diagnosis, seems to claim a very special mention. This affection sometimes takes the mask of a remittent or even continuous pyrexia, retaining of the three ordinary stages of intermittent fever only the hot one; sometimes, without being at all periodical, it puts on the much more insidious form of a local phlegmasia, in which an excessive elevation of temperature forms a dominant and leading symptom.

This double form which intermittent fever assumes, especially when pernicious, is very common in maremmatous countries. But one thing is not well known, or is easily forgotten: this fever, in its double disguise, may be observed outside of the great foci of paludal infection—in Paris, for instance—and is far from being so rare as is usually thought. We emphasize the fact, as ignorance of it may result in the most fatal consequences.

Doubtless this is only a question of diagnosis; but we must add that this diagnosis, even to the most attentive and instructed, has its serious difficulties. Hence, we think we should speak of a sign which, in doubtful cases, may throw light; this sign is simply the extreme elevation of the organic temperature.

Since De Haën, and in these later times particularly, it has been known that the development of the organic temperature differed very notably ac-

cording as it was considered in essential fevers or in symptomatic fevers. While in fevers consecutive to a phlegmasia, even the most intense, the heat of the skin rarely exceeds 39° (102·3°), in pyrexiæ of continued or intermittent type the same temperature is seen rising to 40° or 41° (104°, 105·8 F.).

Dr. Robert de Latour applied this interesting fact to diagnostic uses, and showed most convincingly its value. He was several times guided by this indication to suspect, even to affirm the existence of pernicious fevers, masked under the form of simple phlegmasia, which, misunderstood by other physicians and treated according to the erroneous idea which prevailed, were growing worse and threatened speedy death. Let us add that the change of remedy and the issue of the disease confirmed the diagnosis. The intermittent fever being once recognized or suspected, Robert de Latour, without being alarmed at the violence of the febrile symptoms, or the intensity of the local inflammatory symptoms, without hesitation attacked the disease with large doses of sulphate of quinia, and in more than one case he thus in a few days conquered an affection which was thought extremely grave, and even wholly desperate.

In analogous cases, often obscure and difficult of diagnosis, it is important to use this new sign; and if the peril is imminent it is important to use sulphate of quinia, even if some doubt remains as to the nature of the disease. If the guess is correct and there is a masked intermittent, success is almost certain. Even if there were a phlegmasia—especially one of bad character, resisting obstinately antiphlogistic treatment—we do not think that cinchona can be seriously prejudicial. Much more, we will add, that there will be great chance of its being efficacious; for, as we shall see, there is a class of phlegmasias in which sulphate of quinia finds an express indication, and may even become a potent means of safety.

Neuroses.—Treatment by cinchona is useful in a great number of neuroses, on account of two elements which are very common, namely, intermittence and general debility. Thus, whenever it is possible to prove a distinct intermission in a nervous affection, we may say that (unless there be a special contraindication) cinchona is allowed and often advantageous. So, in order to reanimate the digestive powers and restore the whole system, by giving a new impulse to nutrition, cinchona bark daily renders service in so many undetermined nervous states, and well-established nervous affections, that it is needless to dwell on the subject. Let us further note that some neuroses, by the simple fact that they are seated in such a portion of the nervous system, seem to require, by preference, the use of salts of quinia. Thus it is observed that if the cerebral neuroses generally adapt themselves very badly to this treatment, it is quite otherwise with those which originate in nerves starting from the lungs and heart. Thus, according to the judicious remark of Briquet, sulphate of quinia, which in the physiological state has an elective sedative action upon the nervous system of the respiratory and circulatory system, manifests the same action in the pathological state, and this is doubtless the way in

which it has a most notable favorable influence upon certain dyspnœas, upon essential asthma and convulsive cough; we have often had occasion to verify the truth of this remark, and we might quote (among others) a case of most rebellious spasmodic barking cough, which promptly yielded to sulphate of quinia given in quite a large dose. So the neuroses of the heart with superexcitation of the organ are among those in which salts of quinia have the most marked efficacy. The results in certain palpitations are so remarkable that it has been even said that sulphate of quinia is the true opium of the heart. But it is formally contraindicated (in sedative doses) in cases of grave organic lesions and in persons subject to irregularities and intermittency of pulse, and especially to faintings. It is then well to prefer the preparations of digitalis, which have the happy property of giving energy to the heart, and at the same time of regulating its beats.

Hæmorrhages.—Nose-bleed may in some cases, especially in adolescents, be so frequently repeated as to give rise to a consecutive anæmia of various gravity, and other sometimes severe symptoms. To arrest the flux at the moment it is produced, cinchona is no doubt powerless; but as a means of relieving the organic disposition which makes the bleeding return, it has unquestionable power, and we can certify that we have very often obtained the best results. In this case cinchona in powder is more reliable than sulphate of quinia; from 2 to 4 grammes should be given daily (3 ss.—i.), in several doses.

In menorrhagia, which does not depend on any organic disease of the uterus, cinchona in powder, given two or three times in the interval of the menses, moderates the hæmorrhage very efficiently.

We are, nevertheless, not unaware that sulphate of quinia has also had success in the hands of other physicians; but we think that it had to do with hæmorrhages returning at more or less remote intervals, yet with some regularity of period, and which in this way resembled those various local affections (masked fevers, neuralgias) which usually yield so readily to salts of quinia. Apart from these special cases, we think the preference should be given to cinchona, in the bark, as being more astringent and tonic, and as filling several important indications in the young patients whom we have more particularly in view.

Acute articular rheumatism.—Cinchona, in a large dose, was formerly very much used in England for acute articular rheumatism, and it seems to have had marked success in the hands of quite a large number of celebrated practitioners of that country, among whom figure Richard Morton, Hulse, Saunders, Fordyce, and more recently Haygarth, who, during a long practice of forty-five years, reaped infinite benefit from this treatment.

But it has long fallen into disuse; or rather, all the authors who treat of rheumatism now mention quinia only to condemn and proscribe it. To Briquet is due the credit of having introduced it afresh into therapeutics, and given it a place it will not lose.

Briquet, perhaps more than any other person, has experimented with large doses of the sulphate of quinia, in various diseases, especially continued fevers. Struck with the remarkable sedative action upon the heart and nervous system, it occurred to him to apply it to the treatment of acute articular rheumatism. Considering that this disease presents as predominant characteristics a very intense febrile movement and multiple local lesions, generally superficial and mobile, in which the elements of fluxion and pain play so large a part, and that this disease in addition has usually very marked symptoms of exacerbation and remission, he thought that he might find corresponding points in quinia. Briquet was unsuccessful or but unquestionably successful in his trials with various inflammatory diseases or pyrexiæ; but it was quite otherwise with acute articular rheumatism, in which he obtained unquestioned success by the use of sulphate of quinia.

In the beginning, and while experimenting, Briquet gave the remedy in very large doses (2, 4, even 5 grammes=gr. 30—75), in powder or dissolved in acidulated water. He continued the use of it until the pains and the fever had entirely gone. He stated that this treatment dispelled the pain and fever in a few days, and had no undesirable effects.

Some, however, including Briquet himself, had occasional reason to regret having given such large doses at the outset, for a few patients died with symptoms of meningitis, or with adynamia and collapse, which was reasonably to be attributed to a real intoxication.

Still, if the facts are impartially analyzed, we shall gladly admit that several are susceptible of a less favorable interpretation than that which had been generally made in the first moment; and we will add that these bad symptoms, which are really very rare, were far less attributable to the remedy itself than to the inexperience of the first experimenters.

The unfortunate results, however, alarmed physicians for a moment, and endangered the reputation of this valuable treatment. But Andral, Monneret, Legroux, and ourselves soon came to the aid of Briquet, and were able to prove that which he claimed in regard to acute rheumatism.

Our doses were considerably smaller, 1, 2, 3 grammes at most per diem, a dose which we gradually attained by making small divisions. We were thus able to avoid the former unfortunate accidents.

Monneret (*Journal de médecine*, 1844) tried sulphate of quinia in larger doses than Briquet's, and reached conclusions generally unfavorable to the treatment, to which we cannot subscribe. They are as follows :

1. Sulphate of quinia has an unquestionable influence upon the local symptoms of rheumatism, especially the pain.

2. In a very few cases this action is durable and efficient; most ordinarily it cures rheumatism neither more surely nor more quickly than many other proposed treatment.

3. It does not prevent the development of endocarditis.

4. It has no evident antiphlogistic property.

Monneret also noted, in a considerable number of his patients, grave

typhous symptoms, and pronounced symptoms of gastro-enteritis. But these results should be ascribed to the excessively large doses which he used, and the perhaps too prolonged use of the remedy.

Legroux assigned to sulphate of quinia a much more important part.

The testimony of this excellent physician is valuable, because he had been previously a strong partisan of antiphlogistic treatment, and was in some degree conquered by the evidence of facts. His results (*Journal de médecine*, 1845) were different from those of Monneret, but he used the remedy with much more reserve. Between his researches and those of Monneret there is the difference which separates the circumspect trial of a physician from the rather venturesome experiment of a physiologist.

He first found that the treatment by sulphate of quinia was the most rapid in its effects, the pain and fever yielding with great rapidity, that the blood had less clot, even when no other remedy was used; and that endocarditis was less frequent. He admitted that the relapses were quite as frequent as when other remedies were used.

We have reached the same conclusions, but with one exception, that we do not find the relapses so frequent. If our opinion in this point differs from his, our practice, also, has not been exactly the same. Sulphate of quinia ought to be continued after the apparent cure of rheumatism, exactly as we give it after the cessation of the attacks of intermittent fever.

We, then, like Briquet and Legroux, give sulphate of quinia several days in succession, eight or ten doses a day, or 1, 2, sometimes 3 grammes (gr. 15—45) a day. We thus continue for two days after the cessation of the pain and fever. Then for two or three days we give only 1 gramme per day; then 1 gramme every two days for two weeks at least, even when the patient is eating and beginning to go out. In this way we avoid relapses with much certainty.

The decision has now been made decisive in favor of sulphate of quinia, and experience has placed the treatment among the most successful in acute articular rheumatism. It is not, however, applicable to all cases indiscriminately, and it is important to point out the chief indications and contraindications.

The treatment is chiefly valuable for lymphatic, naturally delicate persons, or those accidentally enfeebled by former diseases, or bloodletting, which has not checked the course of the rheumatism. One of the best conditions of success is found when the articular lesions are multiple, superficial and mobile.

The treatment is much less effectual with those of a plethoric temperament, when the inflammatory symptoms are very intense, the pulse hard, full, developed, and the cerebral susceptibility great, and who are predisposed to congestions of the brain; its action is slight when the rheumatism is confined to one joint, or even when it affects several, if the lesion is fixed, intense, and characterized by the signs of arthritis with considerable effusion.

But even in these, the least favorable forms, treatment by sulphate of quinia will be of some use, on condition that it be aided by calomel in divided doses, or veratria, or digitalis, or general bloodletting in order to modify previously the general inflammatory orgasm; and at the same time it will be fitting to apply leeches and moist cups to relieve the engorgement of the joints.

Treatment by sulphate of quinia is not at all contraindicated in rheumatism with inflammatory complications of the heart, pleuræ, or lungs. But it is very useful to associate with it antiphlogistics and revulsions, which are sanctioned by experience in these cases. It will also usually be useful to begin treatment by general and local bloodletting to prepare the way for the sedative action of the sulphate of quinia.

If there exists, accidentally or as a complication, a well-marked phlegmasia of the digestive passages, sulphate of quinia, being a direct irritant, must not be used.

Briquet, who so well taught the use of sulphate of quinia, observes with great justice that the meningo-encephalitis and the neuroses of the brain which sometimes complicate acute rheumatism, absolutely forbid the treatment, for with these complications the salts of quinia become merely excitants of the brain, and have not time to display their calming powers.

The same may be said of phlegmasiæ of the kidneys and bladder; quinia is promptly eliminated by these organs, and acts on them as a direct irritant.

In blenorrhagic rheumatism the symptoms are often aggravated by sulphate of quinia. Urethritis in particular is injured by the passage of the drug in the urine.

In fine, the pre-eminence of sulphate of quinia over most other methods is favored, on the one hand, by the fact that it does not weaken the system like bloodletting, and on the other, has no bad effect on the digestive organs like certain contro-stimulants, as veratria and tartar-emetic. Hence the convalesence is generally more prompt, rapid, sure, and less liable to those various symptoms which often trouble patients who have been made anæmic by bloodletting or wearied by over-purging.

For the relapse, and particularly when the patient is in a state of anæmia brought on by antiphlogistic treatment, sulphate of quinia is often the only practicable remedy, and is then a most precious resource.

One of its best applications is that to intermittent rheumatic neuralgia. From 30 to 50 centigrammes (gr. 4½—8) often drive away the neuralgia after the first attack, provided the remedy has been given eight hours before the return of the neuralgia.

Gout.—There is no question that, at the beginning of an attack of acute gout, sulphate of quinia in large doses relieves the pain and shortens the attack, at least as surely as those pernicious drugs known as Sirop de Boubée, pilules de Lartigue, etc.; but one need not have grown old in practice to know from sad examples the care with which the attacks of acute gout must be respected, and the dangers incurred by those

who seek a rapid and premature relief. But if in acute and regular gout we prescribe cinchona, as we do all other remedies which are praised in such cases, we do not at the decline of the disease, or when the gout has become vague and visceral, characterized by asthma, dyspepsia, and various troubles of innervation, respiration, digestion, and circulation. It then is useful to give cinchona from time to time in the same way as in fevers; it is especially proper when the patient, in consequence of abnormal gout, has fallen into a deep cachexia.

Symptomatic intermittent fever.—We have already said that acute phlegmasiæ at their onset, like the chronic phlegmasiæ, are accompanied by intermittent febrile symptoms. Cinchona doubtless fails in this case, unless the patient has formerly had intermittent fevers, or there is a real complication, which is not rare in the lands of epidemic fever. In 1834 we tried at the Hôtel-Dieu a series of experiments to show the influence of sulphate of quinia upon hectic fever. In nearly two-thirds of the cases we succeeded in driving off the chill, and the attack was evidently shorter; but after a few days the febrifuge was completely inefficacious and even caused slight symptoms, which forced us to suspend the use of it.

Continued fevers.—Cinchona was almost generally abandoned in the treatment of grave fevers, when in 1840 Dr. Broqua, of Gers, addressed to the Académie de Médecine a mémoire in which he set forth the good results which he claimed to have obtained from sulphate of quinia used as a curative treatment in typhoid fever.

This paper was reported upon by Louis; and at his request several of the physicians attached to the hospitals of Paris continued the trial.

We will not quote the names of all these physicians, or of their pupils, who published the results in the journals or in theses; but we will particularly mention Martin-Solon, who took the lead, and Blache and Briquet, who co-operated in collecting numerous precise observations.

Several physicians out of Paris adopted sulphate of quinia as a base of treatment in typhoid fever, and made much of the success they reported.

We do not understand how a remedy like large doses of sulphate of quinia, which is an energetic stupefacient of the nervous system, can be suited as general treatment for a disease which seems essentially to consist in an asthenic state, a depression of the radical forces, though as an accessory and transitory matter it may be associated with an inflammatory element and more or less dominant phlegmasic complications.

Still less do we understand how typhoid fever, that multiform affection, so various in different seasons, countries, and epidemic constitutions, in different persons too, can be suited by one and the same method of treatment, whether dependent on sulphate of quinia or any other agent of the materia medica.

But with this reserve, we are quite disposed to admit that sulphate of quinia, like bleeding, or any other remedy, may be called upon for its spe-

cial properties in typhoid fever. But let us examine the facts; and let us take Briquet for our guide, who upon this point has a right to speak with authority.

First, let us do him the justice to say that, in spite of the predilection which he naturally shows for a remedy which has been the special object of his study for years, he has had the sense not to be deceived by certain special advantages, and has been careful not to present sulphate of quinia as a really curative agent, still less as a specific, in typhoid fever.

As a result of a close and conscientious analysis of his own and of other published observations, he has stated that the facts hitherto gathered do not authorize the conclusion that sulphate of quinia has a more favorable influence than any other treatment upon the duration or mortality of typhoid fever.

But having said this, he makes some affirmative statements. We will try to sum up as succinctly as possible the general propositions which embody his final judgment.

And first, far from being his general and ordinary method of treating typhoid fever, sulphate of quinia seems to him admissible only as a way to combat certain forms of the disease or certain predominant symptoms.

One fact seems positively proved, to wit, that the sedative action of the drug is very distinctly felt by the circulation, calorification, and the cerebral functions.

Thus in the typhoid affection, when the fever is very intense, the pulse very frequent, the heat of the skin excessively sharp and burning, sulphate of quinia, given for several days, in the dose of 1 or 2 grammes (10 centigrammes at once, every two hours), almost always reduces the febrile movement, lowers the temperature of the skin, and thus lessens one of the most disagreeable symptoms to the patients, and in particular prevents the visceral congestions and phlegmasiæ which ordinarily result from too intense and prolonged fever.

It follows that the treatment must be reserved almost exclusively for cases where the fever, by its intensity or excess, demands to be weakened or suppressed.

After the modification of the circulation and the fever, we shall mention the very remarkable effect of sulphate of quinia upon troubles in the encephalon.

The majority of those who have tried it in large doses for typhoid fever agree in admitting that it quite promptly brings about a very remarkable sedation of the leading morbid phenomena proceeding from the nervous lesion; and Briquet states that in typhoid fevers of the form called ataxic, it quite generally succeeds in calming headache, nightly agitation, delirium, convulsions, stiff-neck, etc.; while when there is prostration, stupor, somnolence, or a comatose state, it is necessary to avoid sulphate of quinia, which almost immediately aggravates those symptoms.

One of the most suitable forms of typhoid fever for sulphate of quinia

seems to be that which is accompanied by very pronounced and regular remissions and exacerbations. In this respect the fevers seem to resemble genuine intermittent and remittent fevers.

Though sulphate of quinia is in ordinary cases well borne by the digestive organs, it must be given with extreme prudence in cases of typhoid fever where there are positive signs of intense inflammation of the digestive tube. It has been seen, when given unsuitably, to produce severe trouble, even eschars of the stomach or intestine.

As regards the doses, Briquet advises, in the lighter cases, to be content with giving from 1 to 1½ gramme (gr. 15—22) per day; in the severer, from 1½ to 2 (gr. 22—30), and in the worst, 3 or 4 (gr. 45—60).

As its therapeutic action is generally manifested in the first days of its use, it should be continued not longer than a week. Beyond that, it will not only be useless, but can only be hurtful and dangerous.

These conclusions embrace some of the chief indications and contra-indications for using sulphate of quinia in grave fevers, and clearly attest the practical sense and the sage and moderate mind of the author.

Puerperal fever.—We all know this pyrexia, which, during some years, makes such fearful ravages in lying-in hospitals. We know the inadequacy of all sorts of the most active treatment, and we are daily reduced to confess our impotence and our deep discouragement.

Yet we ought to mention a new and vigorous effort which has just been made to struggle with this scourge. Piedagnel, physician at the Hôtel-Dieu, has stated the usefulness of sulphate of quinia with carbonate of iron, in the dose of 1 gramme each, for several days in succession, as a means of preventing the attack of puerperal fever. Beau states that as soon as the fever begins it can be driven off by giving daily 2 to 4 grammes (ʒ ss.—i.) of sulphate of quinia so as to keep the patient constantly in a state of cinchonism. In this, Beau merely confirms results which were previously given by Lecomte of Eu, and Leudet of Lyons.

But unhappily, experiments on a large scale, by Danyau and Delpech at the Maternité at Paris, show the uselessness of sulphate of quinia as a prophylactic. Delpech, repeating the experiments of Beau, and we repeating them in a period of a few months' service at the lying-in department of the Hôtel-Dieu, did not obtain the happy results proclaimed by the honorable physician of the hôpital Cochin. Depaul says that at the Clinical Hospital the same treatment failed completely in his hands. Depaul, in order to explain such contradictory results, calls in question the diagnosis of Lecomte and Beau, and refers their successes to simple phlegmasic symptoms in women newly delivered. Whatever the truth may be, although the facts cited in favor of the value of this new treatment are far from convincing, they seem to us to deserve consideration. In view of the great interest attached to this grave question—of the curative and preservative action of sulphate of quinia in puerperal fever, it is right to hope that the matter will not rest where it is, but that physicians who are at the head of lying-in departments will take pains to pursue the experi-

ments begun by a few excellent observers, and to submit the matter to the most thorough testing.

Petitjean, a physician at Sauve, a country infested with paludal fever, believed that sulphate of quinia in large doses had a marked effect on the genital apparatus of women, and often caused abortion. This belief was popular in Italy at Torti's period, and he combated it as erroneous. The experience of our physicians in Africa and our marshy lands has proved that the real cause of abortion was the paludal intoxication. We do not mean to deny the action of sulphate of quinia upon the uterine contractility.

In America, the use of sulphate of quinia has been extended to parturition. In a session of the Medical Society of Knightstown, in a discussion upon the power of sulphate of quinia to reanimate the uterine contractions, Dr. Cocheran reported a case of complete inertia of the womb in which he gave in one dose half a gramme (gr. 7½) of the salt; the pains soon appeared, and the labor went on normally. Dr. Canada thinks quinine the most certain means of exciting the uterine contractions, but on the condition that it be given in a large dose. John Lewis says that he gives large doses in all cases of rigidity of the cervix, and expects the softening of the neck and regular contractions as surely as he expects stools after the administration of jalap. Rich has reported in the *Charleston Med. Journal* for March, 1861, several observations of profuse uterine hæmorrhage, for which he had in vain given all possible remedies, and in which sulphate of quinia met with the greatest success. Warren knows of no more certain means for procuring abortion (*Bulletin de thérap.*, 1862, t. I., p. 180).

This action upon the uterus has been confirmed by Monteverdi and Duboué of Pau, Bouqué, Verrier, and Delafosse (Thèse de Paris, 1873). Guéneau de Mussy made a communication upon it to the Société de Thérapeutique; he has found it useful in menorrhagia, in the dose of a gramme or a gramme and a half. The observations are collected in the thesis of M. Bartharès (Paris, 1872).

Various phlegmasiæ.—In Italy, under the influence of Rasori's doctrine, large doses of cinchona have been given as a hyposthenisant in many phlegmasias, especially acute pneumonia. Of late years the sulphate of quinia has been again tried as an antiphlogistic in France, and a certain number of physicians, especially those of the school of Montpellier, stated that they obtained marked results in inflammations of the lungs and brain.

Briquet, resting on the effects observed by himself in continued fevers, is led to grant more confidence to sulphate of quinia in inflammations of the brain than in those of the lungs. He observes that, while sulphate of quinia, doubtless in virtue of its sedative action, in some respects elective in regard to the nervous-centres, generally acted excellently in congestive or inflammatory complications of the brain in typhoid fever, it was insufficient when applied to similar complications of the lungs, and that he was almost always forced to use bloodletting.

Briquet's observations in regard to the efficacy of sulphate of quinia in the treatment of certain inflammatory complications of rheumatism, or severe fevers, agree with the results of other physicians' practice in idiopathic phlegmasias of the nervous centres; thus in the cerebro-spinal meningitis which has lately prevailed epidemically, large doses of sulphate of quinia have sometimes succeeded where bloodletting usually failed; and in these circumstances the remedy has exhibited a striking analogy with large doses of opium, which, as a sedative of the nervous system, has had, in the hands of a few observers, incontestable value, as we showed under that head.

Let us further note that sulphate of quinia seems to have been given with advantage in certain diseases with pyogeny; as in cases of very inflammatory arthritis, with effusion of pus, where the drug quite rapidly relieved horrible pains of the joints which had resisted the antiphlogistics proper, and further, quenched or diminished very considerably the intense febrile symptoms which usually accompany this severe disease. Finally, sulphate of quinia has repeatedly been of the greatest use in traumatic fevers, and perhaps surgeons are wrong to neglect this potent neurosthenic as a curative or prophylactic in pyæmia and purulent absorption.

This is not the place to discuss the conditions in which cinchona and the tonics in general should be given in acute diseases; this important point of treatment will be thoroughly examined in the general chapter on neurosthenic tonic treatment.

In the same chapter, the action of cinchona will be studied as a bitter, as a hastener of convalescence, as a reviver of the digestive functions, and as restoring to the nervous functions of organic life the lost spring.

Anasarca.—Dr. Hamburger, of Prague, having studied this complication of scarlatina, closely treated forty-seven of his patients with quinia, and in forty-four cases improvement occurred, either at once or in a few days.

He gives the following rules for obtaining the best effects: At the beginning, while the acute period lasts, the use of quinia may be deferred. It may be given boldly, even when the urine is dark and the effusion considerable. But if at the end of three days no improvement follows, we must not persist. The dose for children is from 2 to 10 centigrammes (gr. 0·3—1·5) twice a day, and for adults, from 15 to 20 (gr. 2·2—3). The regimen must be carefully watched, and in particular, the intestinal canal must not be overloaded with food or drink (*Bulletin de thérapeut.*, 1861, t. II., p. 183).

The action of cinchona in large doses is most favorable, according to Dr. Del Bobba, in the anasarca of pregnant women, even with albuminuria. He uses the decoction in the dose of 15 to 60 grammes (℥ iv.—xvi.), which from the first causes abundant diuresis (*Bulletin de thérapeut.*, 1869, t. II., p. 568).

Drunkenness—delirium tremens.—Houssard regards the decoction of cinchona as so efficacious in delirium tremens as to be almost a specific;

he has used the method with almost constant success for forty years. Jules Guérin, hearing this communication at the Académie de Médecine, corroborated it by saying that if wine is cut with a maceration of cinchona, large amounts may be taken without getting drunk (*Bulletin de thérapeut.*, 1863, t. I., p. 88).

External use.—The antiseptic properties of cinchona, indicated by Sloane in 1709 (*Transact. philos.*, French transl., 1732, p. 265), and loudly proclaimed by Ruskworth ("Proposal for the Improvement of Surgery," 1731), have been a thousand times tried and proved by surgeons and physicians, whether the gangrene proceeds from an internal cause, as is common in certain typhoid fevers, or from an external cause, as is so frequently the case in surgery. When the gangrene proceeded from an internal cause, cinchona was given at once, given internally and in application to the mortified spot; but when imputable to a mere local lesion, it was applied to the affected spot, either as vinous decoction, or as powdered bark, or as ointments containing the bark. Under this influence the tissues which begin to be œdematous become firmer, the mortified parts grow hard, and as it were become mummified, and the demarcation between the dead and the living parts is quickly made.

But for these results, large doses of cinchona must be given, and the application made far beyond the parts mortified or threatened with mortification.

Quinia and cinchona, so powerful as febrifuges, are almost useless in the case just spoken of; it is very probable that the febrifuge principle counts little in the antiseptic effect, and that it resides chiefly in the tannin which abounds in the bark. This is made more probable by the fact that the barks and extracts which contain much tannin are as efficient, and even more so, than cinchona, in the external treatment of gangrene.

Columbo.

This is said to have been long used by the Indians in treating diseases of the stomach and intestines, but was not known in Europe until about 1770. The popularization of the remedy was due to the works of Percival ("Medical and Experimental Essays") and Cartheuser ("Dissertatio de radice colomba," 1773). We may find in Murray ("Apparat. med.," t. VI., p. 154 et seq.) the authors who have chiefly applied it in treatment.

When first introduced into the materia medica, it took perhaps an exaggerated importance; but it has since fallen into such discredit in France, that some pharmacists do not sell it once in a year.

We have quite often used this drug. It has proved valuable in the following circumstances, viz.: in functional troubles of the stomach, accompanied by a slight phlegmasia of the mucous membrane, bitterness of the mouth, a sense of heat and pain in the epigastric region, nausea and a little diarrhœa, and at the same time some febrile symptoms; we give

with benefit, thrice or four times a day, a cup of infusion of 60 centigrammes of the root to 200 grammes of water (gr. 9 to ʒ xii.), having previously given an emetic. This infusion is continued for some days, until the functions of the stomach are well established.

The same treatment succeeds very well in acute non-febrile diarrhœa, with anorexia, and bitterness of the mouth.

When there is dyspepsia, with habitual vomiting, chronic diarrhœa alternating with constipation, gastralgia—in short, all the signs of an habitual disturbance of the digestive organs—the long-continued use of infusion of powder of columbo, or of wine in which it has been macerated, restores the digestive functions to their normal state.

Pringle, Cartheuser, and Bertrand de la Grésie used columbo, even in the acute period of dysentery, but Percival observes that it is more suitable during the decline of the disorder.

It has also been recommended in the treatment of scrofulas.

Quassia.

This is a very bitter substance. It contains neither tannin nor gallic acid; hence it is classed among the pure bitters. In a very large dose, it causes vertigo and vomiting, which is due to a principle hitherto unknown, but which evidently exists, as shown by the experiments of Buchner (*Journ. analyt.*, t. I., p. 535).

It has been recommended in dyspepsia, when supervening upon tedious convalescence, when nothing leads to the supposition that there is an inflammation of the mucous membrane of the stomach. It is also proper in chronic diarrhœas entirely free from fever, in which the intestinal supersecretion is not kept up by the presence of ulcerations.

Stomachal vertigo.—The infusion of quassia amara, given morning and evening, for several days, has a happy effect after the administration of bicarbonate of sodium and magnesium, in persons who are affected with those singular vertigos to which Bretonneau particularly called the attention of practitioners.

It has also been commended in scrofulas. Schultze of Spandau, used it successfully in decoction, in the treatment of ascaris vermicularis. He gave by enema the decoction of 15—30 grammes (ʒ ss.—i.) of quassia amara.

The ordinary quantity of q. amara in infusion is 2—4 grammes to 200—250 grammes of boiling water (ʒ ss.—i. to ℥ vi.—viii.). The vinous tincture is given in the dose of 100—125 grammes per day; the extract in that of 1 or 2 grammes.

Quassia Simaruba.—Only the bark of the root is employed. This bark, the bitterness of which is very like that of q. amara, contains a very large proportion of gallic acid and tannin. It has been much more celebrated than q. amara. Used, as it is said, from time immemorial in Amer-

ica for dysentery, it was imported into Europe at the beginning of the eighteenth century, and was singularly praised for the dysenteric fluxes of blood. Barrère, Jussieu, Degner, Pringle, Tissot, and Zimmermann, ascribed to it manifest antidysenteric properties (*Anc. Journ. de méd.*, t. LVII., p. 513).

Neglected in our day in the treatment of dysentery, simaruba is scarcely used except in cases where quassia amara is employed. But it is well to observe that the powder has evident emetic virtues, as proved by the experiments of Desbois of Rochefort, and of Bichat, who class it with emetics.

The powder of simaruba is given as an antidysenteric in the dose of 3 decigrammes (gr. 4½) five or six times a day. The infusion is made with 8 grammes of bark to 1,000 of water.

Coptis Trifolia (Salisbury)—Helleborus Trifolius (Linnæus).

The genus Coptis (κόπτω, I cut) of the class of the helleboraceæ, family ranunculaceæ, is an herbaceous plant found in the northern parts of the globe. The root of c. trifolia has been recommended some time since in America as a substitute for quassia amara. Edward Cress has lately studied it, and found in it berberine and a crystallizable substance, coptine; it is to berberine that the root owes its bitterness, and as it contains neither tannin nor gallic acid, it must be classed with the bitter tonics. It is chiefly used in tincture (Heckel, l. c.).

Angustura.

According to Mérat and De Lens, the natives of the country where angustura is obtained regard it as superior to cinchona in the treatment of intermittent fevers; they also use it like simaruba and columbo in dysentery.

With us, several experiments have been made to test its febrifuge and antidysenteric properties. Reydellet and Niel of Marseilles, gave it in powder to five patient's suffering from vernal intermittent, and all recovered. Fodéré succeeded only three times out of eight in which he tried it. It is not extraordinary that the most insignificant remedy should cure intermittent fever, especially the vernal form; this disease, as we have often said, gets well spontaneously, and the experiment has no value except when made upon cases of tertian or quartan ague of at least a fortnight's duration, with a perfectly regular type. Bretonneau tried the bark of angustura in these conditions and found it perfectly inefficient.

Its antidysenteric properties are no better proved than its febrifuge virtues.

Angustura is therefore of no medical value, for the little good it can do as a bitter may be obtained from any of the indigenous bitters.

False Angustura; Pseudo-angustura; Angustura Virosa; Brucea Anti-Dysenterica.—The bark of true angustura, brought to England in 1788, was long used as a febrifuge; but in 1808 it caused poisoning, and it was found to be mixed with another bark which has since been called false angustura; it was attributed to the brucea antidysenterica or ferruginea observed by Bruce in Abyssinia; later, Virey suspected that it was the product of a strychnos, and this was confirmed by Batka, who showed that false angustura was produced by strychnos nux vomica; and more lately Christison has removed all doubts upon the subject.

Coming mixed with the bark of true angustura, it might cause terrible accidents; and Bretonneau, who tried in his hospital the febrifuge virtues of angustura, saw a patient die in horrible convulsions, a victim to the mistake of the apothecary.

False angustura is thicker, more wrinkled on its surface, variable in color, but always darker than true angustura; its edges are also cut in points and not bevelled.

It is probable that false angustura has the therapeutic properties of strychnos, of which we spoke in the chapter on Musculo-motor Excitants.

Horse-Chestnut.

The horse-chestnut has been lately introduced into therapeutics. The parts used are the bark and the fruits.

In 1720, President Bon read at the Académie Royale des Sciences a note on the febrifuge properties of the bark. This excited no attention. Pontedrea, of Padua ("Dissertationes botanicæ," Padua, 1720 and 1732), and Zanichelli, of Venice ("Intorno alla facoltà dell' Ippocastano," Venice, 1731), insisted more particularly on its properties. This bark fell into just discredit, but was revived by Leidenfrost ("De succis herbarum recentium recenter expressis, eorumque usu ad morbos," Duisburg, 1752, Thesis of Maister), and by Turra of Venice ("Osservaz. di botanic," Venice, 1756), Eberhard of Hall ("De nucis vomicæ et corticis hippocastani virtute medica," 1770), and Buchloz, who translated into German the last memoir by Turra (1783), and affirmed, as did the authors we have quoted, the antipyretic virtues of the bark.

In spite of all this, the bark had again fallen into great discredit, when Napoleon's continental war imparted activity to the inquiry for a substitute for cinchona. The French government itself gave the impulse in 1807, and asked for the labors of physicians. Ranque, of Orleans, published in 1808, in the *Bulletin de la Société médicale d'émulation*, the result of his researches. He said that he had cured forty-three patients affected with intermittent fever by giving from 12 to 15 grammes (3 iii.—iv.) a day of the bark. Lacroix, physician at La Ferté-Bernard (*Annal. de méd. prat. de Montpell.*, 1804), boasted of still more striking success. But Gase, Bourges, Bourdier, Zulati (see Mérat et de Lens, t. I., p. 88,

"Dict. de mat. méd."), did not confirm, by their own experience, the favorable results obtained by their predecessors. In 1861, Bretonneau, who made experiments on a large scale, at the hospital of Tours, upon the pretended substitutes for cinchona, found the bark of the horse-chestnut no more valuable than the other substances which he tried.

The fruit of the æsculus hippocastanum may serve as food for various animals. It is, however, in general objectionable to our domestic animals on account of its bitterness. It contains much fecula, which, extracted by the procedure given by Salesse, is far superior to tapioca and arrow-root.

Flandin succeeded, some years ago, in destroying completely the bitter taste ; it is sufficient to boil it for a few moments with a very dilute solution of carbonate of sodium.

The fruit has been used, though but little, to make peas for issues.

The bark is given in the same doses and in the same way as cinchona.

An alkaline substance has been extracted which has been proposed as a febrifuge.

As to the oil, to which ignorance and charlatanism attribute the power of curing gout and rheumatism, we will confine ourselves to saying that the impudence of those who praise it is unrivalled, unless it be by the simplicity of those who use it. It is entirely inert when used for frictions.

Gentian.

The root of gentian is extremely bitter. It contains neither gallic acid nor tannic, and has no astringent virtue.

The medical use of gentian is very ancient ; Murray brings it back to half a century before the Christian era.

The tonic properties of gentian are pretty well agreed upon. It is of use in sluggish digestion following intermittent fevers and accompanying nervous disorders; it is prescribed with success in difficult convalescence, for persons debilitated by great losses of blood, or mercurial treatment. Experience proves that when mixed with an aromatic and alcoholic substance it fulfils these indications still better, for example, in the stomachic mixture of Rosenstein, which contains gentian with orange-peel in port wine, and Whitt's famous stomachic tincture, in which 30—60 grammes of spirit of lavender were put into 500 grammes of ordinary alcoholic tincture of gentian.

Boerhaave first recommended gentian in the treatment of gout; and this plant formed a part of the famous anti-arthritic powder of the Duke of Portland. It is singularly efficient in reanimating the digestive functions, usually so profoundly affected in convalescence from inflammatory gout, and almost constantly so in subjects of atonic gout.

Its febrifuge virtues are at least very doubtful, whatever has been said by the numerous authors who have experimented on vernal inter-

mittents, or on remittents, which usually cease without the aid of medicine.

Plenck has recommended it in the treatment of scrofula. He gave the extract in rather large doses. At present, in the same disease, the extract is prescribed, and more frequently the wine. It formed a part of the bitter elixir of Peyrilhe.

Gentian forms a part of a multitude of magistral preparations which have formerly had a great repute, but are forgotten to-day.

NEUROSTHENIC TONIC TREATMENT.

The neurosthenic tonics act by impressing vital resistance directly upon the system and re-establishing its synergies. This is the proposition which we are to develop in this chapter.

In the preceding section much has been said of the force of assimilation. Our attention is now to be called to the force of vital resistance.

We think Dumas of Montpellier showed proof of a clear intelligence when, in spite of the attacks and unjust criticisms of Barthez, he ascribed to the system a force of vital resistance distinct from the force of assimilation. When we have stated what specially concerns neurosthenic tonic treatment, we will state in brief the points in which it differs from the analeptic tonic treatment. But before going further, it is very desirable to explain wherein the force of vital resistance differs from the force of assimilation.

The physiologist whom we have just named, after establishing the two forces in question, defined badly (as we think) the force of vital resistance, and omitted to justify its admission by obvious and striking facts. For this reason we are obliged to rectify and explain this notion, and to base it upon the observation of more distinct and characteristic facts.

The force of assimilation is a property possessed by all organized beings, of converting into their own substance, that is, assimilating, nutritive material of which the composition varies according to their constitution, but is determined by constant primordial laws.

The force of vital resistance is that other property, possessed by the same beings, of persevering in their existence to their natural term, through all causes of alteration or destruction to which they are exposed.

In the lowest animals this force seems confounded with the force of assimilation which comprises nearly the whole of their existence. But in man, the object of our science, it has phenomena and laws which demand to be considered separately.

Dumas may be wrong in making it a force apart, a being existing by itself, executing distinct acts, as among the organic apparatus that of digestion exists and executes acts distinct from those of the respiratory organs; this is possible, but is of small consequence to us. If we are unwilling to allow that this is a special force, created *ad hoc* and exclusively

presiding over vital resistance, let it be only granted that the property expresses a great physiological fact, to which a certain order of phenomena must be subordinated, which, from their importance, and the special results which they offer to observation, ought necessarily to be capable of attachment to a single principle. It may be an abstraction; but it is an abstraction reduced from the observation of man vigorously resisting the cause of injury, by virtue of conditions of his own; as fecundation, for instance, is an abstraction drawn from the observation of creatures who fecundate in virtue of their conditions; and as life is an abstraction drawn from the observation of beings which live under certain particular conditions.

All this will be explained if reduced to simple facts, which are sanctioned by the authority of experience and common sense.

Given an individual in the most perfect anatomical and physiological condition, living under ordinary and regular influences, it is impossible to determine *a priori* the degree of vital resistance he possesses. It is necessary to see him in operation, so to speak. Neither can we recognize the property in him *a posteriori*, for it is by no means necessarily in direct relation with his force of assimilation, the mass of his locomotor apparatus, the development, the volume, consistency, proportion of his external forms, any more than it is with the more or less normal structure, the conformation, the anatomical disposition of his internal organs.*

It would be a gross mistake to suppose that because a man is well formed, of a fine muscular development, even an athletic constitution, or even because his organs are all in the most normal state anatomically and physiologically, that he will resist harmful influences better; that if attacked by a cause of disease the symptoms of the disease will be more regular, more calculable in their course, better co-ordinated in their acts and periods, requiring more simple and natural treatment, and terminating more promptly and definitely than the same symptoms resulting from the same cause in a subject evidently placed in organic conditions apparently much less favorable.

How many rosy-cheeked persons, fresh and in good flesh, of energetic nutrition, with teeth well set, long hair, plastic and immediately organizable blood, etc., who are overthrown by a puff of wind; who cannot bear the loss of two ounces of their rich blood; who are annihilated by a bath; whom a fright makes to faint; who fall into syncope at the least emotion, at the sight of a lancet, at the pain of a blow, of a slight burn, etc. ! Calorification is a function very suited for testing the degree of vital resistance. Directly connected with the most elementary vital state, it is also the most

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* When we say that the degree of vital resistance is not related to the structure, conformation, and anatomical disposition of the organs, as more or less normal, we of course mean this within certain limits, and have not the absurd intention of showing that an organ performs its functions just as well when its anatomical conditions are completely reversed. The thought will be explained by our examples.

faithful expression of it. In fact, the persons in whom vital resistance easily gives way, are incapable of that spontaneous excitation which in others counterbalances the depressive action of cold, as also of that spontaneous sedation which should combat the oppressive and overpowering influence of excessive heat. Such persons are soon chilled, or overcome by heat.

They represent the form of assimilation at its maximum of activity, and yet they show the force of vital resistance at its lowest point.

How many thin persons, pale and of defective constitution, sometimes suffering from a congenital vice of conformation, or an acquired organic lesion, live with impunity in the midst of deleterious influences, foci of epidemics, without being affected by them; when affected by morbific causes, they react in a salutary way and recover their physiological state wonderfully; while the former class, if exposed to the same causes, succumb or survive with difficulty and in the midst of all sorts of anomalies or perils which attest the weakness and incoherence of their vital resistance!

This organization, apparently so delicate, often bears loss of blood better than the other. In physical and moral pains, trials of all sorts, it is always able to repulse their blows by natural and synergic efforts, that is, efforts which derive their force from their spontaneity and harmony. Finally, when submitted to great elevations and depressions of temperature, it easily opposes to them a spontaneous excitation or sedation sufficient to neutralize their harmful influence.

These people are the perfect type of the force of vital resistance at its maximum, and yet they are the type which exhibits the force of assimilation at its minimum of activity.

This force of vital resistance, causes one individual to live long without great derangement of health, almost without functional disorders, while another succumbs rapidly or leads a life of pain, though both may be affected with the same lesions of the heart or lungs. It is this that gives viability to one infant at seven months and denies it to another, though both have all the requisites for life in apparently the same degree.

It seems to us impossible to deny the advantage and the necessity of admitting the existence of a force of vital resistance entirely independent of that of assimilation, the degree of which cannot be correctly estimated by the anatomical state of the system.

The ganglionic nervous system, as we have already said, seems to us to concur specially, by the nature and the importance of its attributes, in producing and regulating the phenomena of this force of vital resistance.

Let us now recall what was said under Tonic Treatment in General; to wit, that certain morbid causes, by their essentially deleterious and anti-vital nature, strike directly at the principal foci of this system, and annihilate or disorganize primarily the vital resistance; and that other causes, not necessarily morbid, encountering the system in certain states, some of which can be determined while others are quite indeterminable in advance, produce the same result.

It remains to speak of these pathological states for the purpose of throwing light on the therapeutic indications required of the neurosthenic tonics.

These remedies are in general the bitters, but more especially, and in a degree unapproached by any other, *cinchona.*

The most marked characteristic of the diseases we shall consider is *malignity.*

Some of the moderns have laughed a great deal at this expression, and have erased it from medical language; the thing itself has been ridiculed and ignored, like the name, which ought, however, to be re-established, since it marks a grave and incontestable fact, which no other word expresses more exactly.

What is malignity in pathology?

Listen, not to a definition, but to a comparison, as just as picturesque, made by a great physician.

"Malignant fever," says Tissot, "is a dog which bites without barking."

The striking fact in malignant affections is their insidious course.

The insidious imminence of the direct and immediate extinction of life is that which constitutes *malignity.*

"The resolution of the radical forces seems to me to constitute malignant disease" (Barthez).

The truth of this proposition depends greatly on what Barthez meant by "radical force." If he meant the plastic force, we think him in error. If he meant the unity and the relation of the animal and vegetative functions, he is profoundly right.

It has been thought that the word *malignity* might be replaced by *ataxia.* We think this wrong. Ataxia expresses a disorder, an incoherence, a want of general functional harmony, and does not necessarily involve the idea of a fatal termination. It is a generic word which embraces all and specifies nothing. *Malignity,* on the contrary, is a species of ataxia, which bears upon the vital functions of which the exercise is actually and incessantly necessary for the persistence of life. This is the reason why it has taken the name of malignity; because, the force which presides over these functions being struck at directly and in its essence, the synergy or simultaneousness of action which ought to reign among them under pain of death being broken, existence is presently and insidiously threatened with extinction.

This distinction is of the highest importance in respect to the object of treatment which here occupies us; for the use of neurosthenic tonics is not indicated in every ataxia, but only in that which unites the conditions which we have specified.

The functions of one or several apparatus may be in a state of deep prostration, disorder, want of harmony, incoherence of phenomena, with an absolute freedom from danger and without compromise to life; and we do not except the vital functions from this statement. But it is ne-

cessary to this end that the cause of the anomalies should not bring its influence directly upon the vital force of the economy. This is what constitutes oppression of the forces, indirect feebleness and ataxia, which furnish quite opposite indications for treatment.

It is very important to discriminate these two states, which so resemble each other outwardly, yet in essence, in nature, and in treatment, are so diverse.

Barthez ("Nouv. élém. de la science de l'homme," t. II., p. 181 et seq.) established the following principles, which we will develop and illustrate:

"In malignant diseases, the system of the forces of the vital principle is weakened by a true resolution of the forces of all the organs, which the primitive causes of these diseases produce by introducing the greatest disorder into the succession of the functions."

In order to get a just and striking idea of this resolution of the radical forces which bring such disorder into the succession of the functions, let us begin, as we are accustomed to do, by seeking for our types in physiological cases, and then in those which we see produced by toxic agents; and thus reach the affections which are relieved by the neurosthenic tonics.

The effects of the depressive passions, of fear, for example, are very suitable for an introduction to the physiology of the malignant diseases.

Suppose a cowardly man suddenly seized by profound fright at the sight of an object which threatens his life; and, to enforce the situation, suppose that the man is weakened by want of food.

It is an established expression—"to be frozen with fear." Thus, then, life is suddenly attacked in its most characteristic sign, spontaneous calorification. The refrigeration is not felt as the sequel of any special function. An indivisible instinct has, in certain cases, confounded the cause and the effect; more than once the effect has been death. This death, or not to go further, the cold and instant syncope of fear, were preceded by what? By an affection of the brain, heart, or lungs? Which of these first fell into resolution and involved the collapse of the others? There was no agony, for agony is a combat, and here the first blow was mortal. It is not the primitive abolition of a special function, indispensable to the action of the others, that suspended the latter by its arrest. It is the cessation of the general relation, or the total, the rupture of the unity of the great vital centres. This unity is seated in the entire organism, and not elsewhere. But if it required a seat, we should assign it to the trisplanchnic nerve.

Let the trachea be suddenly obliterated; let one of the cavities of the heart burst suddenly; let a rapid laxation of the atlas upon the axis cause instant compression of the medulla oblongata; here is direct death by the lungs, the heart, or the brain. But let a person be stretched lifeless by a violent blow upon the epigastrium, without any appreciable lesion of organization; or let the same effect be produced by the announcement of bad news (and here the mechanism is the same), and we shall say that life,

the vital principle of the man, has been extinguished at its source, which is neither the heart, the lungs, nor the brain. After saying where it is not, we shall certainly not be required to say where it is; for that would require an excursion into comparative physiology and embryology, which we must abstain from. We have shown the fact, and that suffices for our purpose.

Let us return to the primary effects of fear.

This glacial cold is interesting to observe, for we shall find it at the opening of malignant diseases of the gravest and most distinct character. Let the modern partisans of the chemical and mechanical theory of calorification; let those who attribute the cause of all organic heat to the formation of carbonic acid in the lungs, to the rolling of blood-globules, to the chemical combinations of nutrition, measure their theories with the fact which we are studying!

A direct attack upon the radical forces of the system which preside over vital resistance will soon be betrayed by functional incoherencies. The synergies are broken, constituting ataxia; and if these broken synergies are those of the vital functions, there will be malignity, partial cold sweats, diarrhœa, involuntary passage of limpid urine, the wish to speak without the power; efforts to fly, while the foot is fatally fixed to the ground; the dry mouth; absence of perception of the causes of physical pain, of a burn, a blow or a cut; such is a part of the picture. The movements of respiration have no co-ordination with those of the heart; energetic and partial arterial throbbing will take place. Icterus will appear. The instinct of self-preservation is perverted and powerless, etc.

You have seen life tottering and ready to fail. Two ounces of wine conveyed to the stomach may knit up the synergies and give firmness to vital resistance.

Some poisonous substances, as divers septic animal poisons, the poison of ophidians, of plants, as tobacco, datura stramonium, hyoscyamus, etc., produce symptoms analogous to those of malignant diseases, which attest a direct action upon the radical forces. The descriptions may be seen in works on toxicology.

"It is very important to distinguish well this state of resolution of the forces which characterizes a malignant disease from the state of simple oppression of the forces, since in this oppression, suitable evacuations develop, often very promptly, the action of the radical forces which were supposed to be extinct."

Two men lie cold, pale, pulseless, without movement, without sensibility, without consciousness. The one neither moves, feels, nor thinks, because he is gorged with food and drink, the other, because he has fasted four days. These two men may be brought back to life in an instant. The choice of remedies is not indifferent. The one has all his forces concentrated, though not in action; they are only chained up. If he is evacuated, they will display themselves suddenly. The other's forces are not in action, because they are no longer in force. Give him a cordial, then

soup, and they will return, not suddenly but gradually, because it is necessary to reinstate his power.

This case often occurs in practical medicine, and it is needless to say how important it is not to confound an action which embarrassed, solely oppressed in its manifestation, or play, with one abolished in its cause, in its forces of impulse; not to confound a limb which, in spite of the most energetic muscular contractions, produces only obscure and abortive muscular actions, because it is fixed and held moveless by superior force, with a free paralyzed limb which refuses to obey the will.

"It seems to me that the radical forces of the whole system are resolved in an acute disease when the manifest causes which have prepared and produced it have profoundly affected these forces, and directly injured the functions of several organs; and that they are merely oppressed, when the special lesions of the organs which constitutes the symptoms of the disease are entirely dependent on the lesion of one single organ."

A poison of the nature of those we were just speaking of is carried by the circulation to all the organs and strikes them with langor, or throws their functions into a state of disturbance and incoherence. An important viscus is violently inflamed, and from the absence of the physiological influence which it used to shed upon the other organs, or from an excess of reaction generally unequally borne by these organs, a great disorder reigns in the system; the general and particular acts of the economy suffer and are in danger through exaggeration, insufficiency, or functional depravation. We are supposing the latter case in the instance of a man who is surprised while in good health by an accidental malady, whose cause is not specific.

We must here put the same questions as in the former examples. In the first case, that of a general intoxication, a deleterious principle, hostile to life, everywhere present, everywhere in direct contact, has poisoned all the organs and the living molecules at once. There is consequently no organ, no portion of animate matter which is capable of a natural action, for all have felt the toxic influence. We may consider the system as an assembly of beings, individually poisoned, whose isolated acts, without unity, discordant, are injurious in proportion as they are numerous, because each one of them uses up vitality without contributing to the general profit.

In the second case, that of an isolated organic lesion which exaggerates, debilitates, or disturbs the action of the other functions, the organs which are not reached by the idiopathic change only sympathize with the one which is the primary and single seat of the disease, and the disease affects the functions of the organ only secondarily, that is, after affecting its tissue.

Thus, though in this case all the functions may be injured, they will not all be affected directly, because the cause which has primarily affected the organ is not present with all the organs, and the functional derangements of the latter are not the result of an immediate attack, but of a re-

bound from elsewhere, produced through the *consensus* which united all the parts.

If we now suppose that the cause which has struck one single organ with inflammation (for instance, the lung, in pneumonia) has simultaneously struck a certain number of important organs, as we see in certain general inflammatory states, we shall have a resolution of the forces, but through *oppression;* and if this is not Barthez's thought, he was strangely mistaken, for otherwise the lesion of the functions would not be, as he expresses it, direct, but indirect, since these functions would be injured only consecutively to the change of tissue in their organs. It is necessary, in order that the lesion be direct and involve the idea of extinction of radical forces, that the function be disturbed or destroyed at a blow, and not secondarily to the disorganization of the tissue of the organ which executes it. Thus purely nervous syncope is a direct lesion of function which reveals a radical inaptitude, while a structural cardiac lesion attacks the life of the heart very indirectly.

Let this principle be applied to all the organs and functions by themselves, as well as to their totality, and we shall have the spirit of the proposition of Barthez, as we think we ought to interpret it; for, though he does not make his intention explicit, he plainly seeks to oppose the words "direct lesion of functions" to the words "resolution of the radical forces," and "lesion of an organ" to "oppression of the forces."

The malignity of a disease is produced in two very distinct ways.

In the first case it is due to forces by themselves antivital, as the sad passions, septic poisons, and certain morbific influences which are especially remarked in epidemics. Here the cause is all or almost all.

In other cases the conditions of malignity are on the part of the individual. Those which are known to us depend in general upon a weakening of the radical forces, produced by degrees by previous diseases, or excesses, or excessive evacuations, etc. Any morbid cause which strikes the system in such conditions may determine affections which assume a malignant character.

"It is necessary, then," says Barthez, "in order to recognize a malignant disease, to examine whether its production has been manifestly preceded by grave or protracted causes, some of which have essentially enfeebled the system of the forces by causing great disturbance in the *harmony and succession of the functions*, while others, in the primitive formation of the malady, have affected several different organs *per se.*

"Some of these causes are those of general exhaustion, as want of food, excessive loss by transpiration, etc.

"Other causes of resolution of the radical forces are long neglect of the exercise of the power of several organs, and their *violent distraction by simultaneous efforts in different directions.*

"Sanctorius very well observed that the malignant fevers were chiefly determined: 1, when excess had been committed—excess in several non-natural things *at once*, as the pleasures of the table, love, and the pas-

sions of the soul; 2, when the previous errors of regimen have, so to speak, tormented nature *in contrary directions*, some conveying impressions to the viscera and others to the external organs, etc.

"When the system of the vital forces is much *and simultaneously* affected by the sympathies of the actions of two organs *whose efforts are not united, but are made in different or contrary directions*, these sympathies tend to determine *simultaneous* alterations in the *forces* of the principal organs, which are the brain, the heart, and the viscera collected in the epigastric region.

"These alterations are either *contrary* or extremely diverse *inter se* in respect to mode and degree. The *unity* of affection *necessary* for the exercise of the powers of each principal organ *must* then be wanting; which promptly causes the *interception of the functions essential to life.*

We have underlined the words which seem most suited to inculcate in our hearers the general ideas upon which rests the notion of malignity in diseases.

It follows, as we have often said, that pathological harmony is the surest guarantee of the benignity of a disease and of the maintenance of vital resistance; that pathological want of harmony or ataxia is the least deceptive sign of the gravity of disease and defect of vital resistance, when it has the essential characteristics which we have stated, and especially when, bearing on the vital functions, it constitutes malignity.

Having thus defined or distinguished malignant diseases, and shown the way the causes act, we ought briefly to sketch their general characters, their course and termination, in order to set forth the intimate relation which exists between their etiology, their nature, their forms, and thereby to legitimate the treatment which suits them, the motives or indications for which are very naturally deduced from this series of considerations.

Professor Récamier, in the notes which follow his "Recherches sur le traitement du cancer" (t. II., p. 424 et suiv.), has attempted this description, and we cannot do better than to reproduce it here, for no one has better seen or expressed it.

"In ataxic fevers, vital resistance is active or sluggish; but is essentially feeble and disposed to become extinct, whatever may be the form, sthenic or asthenic, of the phenomena, which are strongly or feebly marked and without exact mutual proportion. Their course is incoherent; the termination is difficult; the action of the morbific and therapeutic agents, for good or for ill, is not proportioned to their apparent quantity or the phenomena produced.

"In ataxic biosic fevers, the oppressed" (it would have been more accurate to say depressed) "or exaggerated vital action lacks resistance and tends to extinction, whether it produce the symptoms of cold and heat, or those of secretion carried to excess. This is what happens in the algid fevers to which patients succumb in cold and sedation, in hot fevers, in which heat and overstimulation cause death, and in sweating fevers, which cause death by excessive loss.

"The phenomena are not proportioned the one to the other; the sense of burning heat is associated with that of cold, the sensation of glacial frost with that of heat; hot sweat with a close, frequent, irregular pulse, etc., which is evidently related to the combination of anomalies of general sensation and the common vital functions, in connection with which we may observe motley redness, vermilion color, lividity, or sweat in parts of the skin that are cold. As to the phenomena, the following forms are observed: 1, the *exclusive predominance* of the phenomena of one of the three stages of cold or supersedation, heat or superstimulation, and arrest of secretion; 2, the *incoherent mixture* of these three orders of phenomena carried very far, as the highest heat with the weakest pulse, etc.; 3, the *alternation* of these same symptoms, in the highest degree of intensity and excessive cold giving place to an ardent heat; 4, the *moderation* and apparent regularity of the symptoms during the first periods of the disease, and their fatal and unexpected gravity at a more advanced date without evident, still less proportionate cause. Such are the slow and nervous fevers.

"The causes act without proportion to the following effects, like a walk near a marsh, etc.

"The therapeutic agents which seem indicated often produce none of their proper and desirable effects, and give rise to evil effects which often can neither be foreseen nor hindered.

"The terminations are incomplete or bad, as when grave internal phlegmasiæ replace the critical secretions which were to be expected, or when gangrene, with or without antecedent or concomitant inflammation, attacks the buccal, guttural, gastric, or intestinal mucous membrane, the skin in the places where it has undergone compression, or various special organs of the respiratory, circulatory, digestive, or sexual organs, etc.

"In febrile ataxiæ, also, we sometimes observe the greatest anomalies of the special vital functions of respiration, circulation, etc. Thus the tendency of the common vital functions to extinction, which constitutes the true vital disorder or ataxia, ought not to be measured solely by the tumult of the phenomena, but by the state of vital resistance. Any mistake upon this point may inspire a fatal security, and I must insist a moment on this point of clinical teaching.

"The name *ataxic* is given to a state of vital disorders in which *life is threatened* generally or locally, whatever may be the apparent violence or moderation of the symptoms. It is not right to regard ataxia as the trouble and disorder which accompany the inflammation of some viscus. A man of thirty-five years, with a good constitution, has symptoms of fainting which soon cease, and return at the same hour on the next day; no precautions are taken, the symptoms return on the day following, death occurs, and the autopsy shows no physical lesion to which so speedy a fatal issue can be ascribed. A young lady of nineteen years has similar symptoms; after the second return, cinchona is given in a large dose; the third attack is very slight, and the patient recovers directly. Whatever be

the form, algid, ardent, sweating, delirant, spasmodic, paralytic, comatous, orthopnœic, choleric, dysenteric, hæmorrhagic, pleuritic, pneumonic, gastralgic, painful, etc., the practical result is the same as that of which I have just spoken. I now ask what is the important thing to know in the case I have just cited? Is it the agitation, the disturbance? But when these symptoms constitute simple hysterical, epileptic, asthmatic, neuroses, etc., they do not threaten life, and especially not immediately; and when they depend on some evident local inflammation, they have a different course, bleeding relieves, and cinchona is injurious. Is it not evident that the mode of invasion, the unexpected return of the symptoms and their progression, the value of which is admitted, are very much more important to grasp than painful local affections which do not cause death in the same way?

"What I have just said of intermittent ataxic fevers must be said of the continued and remittent of the same order.

"There are no symptoms without organic lesion; we grant it; and if so, it is necessary to determine the presumed organic lesion in a child who is thrown into convulsions by tickling the soles of his feet with a feather; in the lipothymic person who regains health by the casting of a few drops of cold water upon his face, by the horizontal position, etc.; for there is no form of symptoms so grave that I cannot show cases in which it is made to come or go by agents incapable of producing or arresting inflammation, and *a fortiori*, insufficient to cause the least organic lesion.

"The febrile ataxic state should be regarded from the point of view of vital resistance or energy, and not only under that of the vivacity, the slowness or disorder of the accompanying phenomena; that is, in febrile ataxia it is necessary to consider:

"1. The local or general tendency to present extinction of life, a tendency which lasts until the cessation of the last phenomenon of ataxia, however unimportant it may appear.

"2. The variety of the forms of phenomena, sometimes turbulent, sometimes with collapse, sometimes with apparent moderation, while the danger to life is no less in the one case than in the other.

"When, then, vital resistance is immediately threatened, without evident local and primary affection, to which the symptoms can be ascribed, I say that there is *ataxia*."

Few pages in medicine have been conceived and written with this clinical originality and sagacity. Nevertheless, certain descriptions of pulmonary sounds have been much more esteemed and celebrated than this masterpiece.

The talent of recognizing a malignant disease at its commencement, the still more precious penetration which, in the midst of a benign or grave disorder, discovers ataxic tendencies, and deduces the positive indication for radical tonics, are the most admirable privileges of our profession, surround the physician with a power and a respect which seem superhu-

man, and (what is very important) inspire him with confidence in the power of his art.

Hippocrates promises to the physician the esteem and admiration which will follow him when he succeeds in unmasking malignant affections: "Proinde ubi talium affectionum naturam, quantum scilicet vires corporis superant, cognoverit, simulque et si *quid divini* in morbis inest hujus quoque providentiam ediscere oportet. Hac enim ratione merito sibi admirationem et boni medici existimationem conciliaverit" (Hipp.: "Prænot.").

The Father of Medicine attached a very distinct and just idea to this expression "divinum quid." This may be inferred from several passages in his writings: "It seems to me," says Barthez, "that Hippocrates designated by this term an unknown cause, which renders disease very grave, and even speedily fatal; the effects of which cannot be referred to sensible causes which are recognized as able to overcome the power of the living body.

"Thus, this divinum quid does not exist, according to Hippocrates, in a particular inflammation, the progress of which is admittedly sufficient to produce death by destroying the inflamed organ; but it occurs in truly malignant fevers, in pernicious anginæ, where no signs of inflammation or of gangrene appear, and in several other spasmodic affections of a deadly sort."

This astonishing genius, to whom we owe almost all the great principles of the art of healing, recommends a very precious criterion to warn us of the fatality of malignant affections, and to fulfil opportunely the vital indications which they present, "Si quid in morbis præter rationem eveniat, non fidendum."

It is, indeed, necessary to distrust all that departs from the regular course of nature; to distrust the symptoms which have no evident relation with the known constitution of the patient, the sort of affection he has, or the influence, determined by observation, of the internal and external modifications which act upon him. This is the reason why pathological harmony, the conservation of the synergies, are the attributes of the vis medicatrix; the latter is calculable in the progress and concatenation of its acts, while the characteristic of ataxia is not to be calculable. The vis medicatrix has only a few direct and open ways for re-establishing the physiological order. Ataxia, malignity, which we might (with Stahl) call a delirium and a distraction of the vis medicatrix, "in malignis anima obliviscitur et desipit; neque deinceps nec tuetur nec vigilat (Stahl), has a thousand unforeseen ways to lead to death.

"When nature is in full vigor," says Grimand, "her movements are perfectly regulated and measured; they present themselves constantly in the same order, and therefore are very easy to follow and to know; but it is not so when she experiences profound aberrations, for their number is indefinite; and as she tends to her conservation by simple procedures which are always the same, she goes to destruction by paths of which it is impossible to fix the number."

Hippocrates also demanded, in order that a disease be simple and exempt from danger, that it should present the clearest possible relation to the age and constitution of the patient and the season: "In morbis minus periclitantur ii quorum naturæ, et cetati, et habitui, et tempori magis similis fuerit morbus, quam ii quibus horum nulli fuerit similis."

It is now time to turn for an instant to the resources which materia medica offers for relieving the grave morbid states, the nature and aspect of which we have first had to determine. If it was thought that we have spent too much time upon it, and that such excursions into the field of general pathology are misplaced and supererogatory in a treatise on therapeutics, we would reply that we are faithful to our original purpose of searching for and distinguishing the real source of indications before the act of filling these indications, and that the result of the latter operation would in turn confirm or invalidate the former datum; in one word, that all the things which indicate should be constantly attended to before the things indicated, etc.

We abstain, as far as possible, from this task when we know that the true sources of indications are properly set forth in the modern works which serve for the instruction of pupils; but we do not shrink from it, and it seems indispensable for us to undertake it, when it is clear to us that these things are despised or unknown. It is not our fault if the notions which we have just set forth are forgotten and neglected for knowledge of a much less important order.

We have observed that, in combating disease which directly strikes and weakens vital resistance, specific remedies are wanted, that is, those which produce immediate therapeutic effects, not preceded by appreciable physiological effects.

Cinchona unites this condition remarkably.

Barthez has best characterized the specific virtue of cinchona. The increments of these forces (the radical forces), says he, are made directly by the action of various fortifiers which may act directly upon these forces. It is also natural that fortifying remedies, such as cinchona, for example, should increase directly the radical forces of the vital principle, as it is that poisons should attack directly, and even destroy, these radical forces.

That our conception of the action of radical tonics is based on facts, of which it is the most general formula, is shown by the treatment of intermittent fevers by cinchona.

Hippocrates, who was destitute of this heroic remedy, noted in the remedies which he used for this class of fevers the property of fixing the organic forces, and of fortifying the vital resistance against the return of the febrile attack; a theory which he stated as clearly as possible in this phrase ("De adfect.," cap. 4): "Harum autem febrium (tertiana et quartana) medicamenta hanc habent facultatem, ut, his epotis, corpus in loco sit; hoc est in consueta caliditate et frigiditate juxta locum consistat, neque præter naturam incalescat, neque refrigeretur." We have been striving for nearly two hundred years to discover the physiological mode of action

of cinchona, which is the philosopher's stone in therapeutics; and more than two thousand years ago Hippocrates wrote, so that nothing can be added to it, the general formula of this action. To many, this formula may seem a commonplace, because it is only a fact immediately—and, one would almost say, naïvely—deduced from the observation of a result; and it is forgotten that these incontestable general facts, which are above explanation, are the foundation of science.

It is doubtless with the object of paying homage to the above opinion of the Father of Medicine that Barthez very justly says: "I give the name of true tonics to remedies, such as cinchona and iron, whose specific action establishes throughout the system and the forces that which I call *the stability of energy*."

A few examples of daily observation will make this very evident.

A man has intermittent febrile attacks. You give cinchona methodically—that is, in the apyrexia. The following access is considerably mitigated or even suppressed, yet the man remains exposed to the influence of the morbific cause, as the marsh miasmata. The appreciable physiological action of cinchona has been completely null; and if the return of the intermittent trouble had not indicated it, nothing would have revealed the effects of an agent which, nevertheless, had a very powerful action. But the vital resistance of the economy grew weak periodically, and cinchona gave back to it its stability of energy. The cause may continue in action but the action is neutralized by a vital resistance superior to it, and cinchona alone made immediate provision for this. The vital resistance had been stricken idiopathically; it was restored primarily. We have seen how the causes of malignant diseases act; and so their antagonist: *par malo remedium.*

Experience has shown that dwellers in marshy lands, where fevers are epidemic, are, to a certain point, protected if they take cinchona regularly as a prophylactic. We shall see hereafter if this remedy has a double action here. In any case would it be wrong for us to affirm that the appreciable physiological action of cinchona, without arousing the slightest sensible phenomenon more or less, has preserved it sound and strong against the action of an efficacious and almost certain cause of disease. It has not changed the organism but has prevented it from being accessible to a change of state; it has given stability to its energy, and fixed its vital resistance: "faciunt ut corpus in loco sit."

It is so true that, in some cases which we will presently define better, the radical tonics act simply by impressing upon the system the quality of vital resistance, and by forearming them against the depressing influences of this force, that their use is never more opportune than at the moment when the functions enjoy their highest stability and harmony. Thus, they must be taken between the accesses, when everything has returned to order; and the most remote period from the coming access is the most suitable for introducing them into the system; for they do not arrest an access which has commenced, but prevent that which is to come.

It is generally believed that cinchona and its substitutes are in all cases the antidotes of the morbid cause; that they neutralize the cause as mercury is believed to neutralize the cause of syphilis. It does not seem to us to be exactly thus. Cinchona often lets the cause remain in all its intensity, but puts the system in a state for resisting it, and the result is the same. Mercury, that other specific, does not give the system the faculty of being inaccessible to the morbific influence, for taking mercury does not prevent taking syphilis ; but if the malady exists, it alters its effects.

The action of the radical tonics will be the more potent if they are employed in intermittent affections, that is, such as reproduce themselves after intervals of rest in which the system recovers its condition and is susceptible of being fixed in an equilibrium which it must preserve ; it is well to add that the same causes that produce the intermittent fevers also produce remittents and even continued fevers, as is seen everywhere, especially in Algiers.

It is extremely important to make a distinction here, of which no one has thought, and which we were the first to attempt to mark with precision. This point of general therapeutics is so important that we shall not fear to develop it at some length.

Of the necessity of not confounding the type of diseases with their nature, and of cinchona considered as one of the means of avoiding this confusion.—Pinel, a writer of antique severity, and that scientific conscience which is now so venerable and so rare, indulged in no ridicule except as directed to the physicians who sought to penetrate the proximate causes and the nature of diseases, in order to deduce therapeutic indications. In nosography all these things are dispensed with, and the method of the botanists hardly teaches them. We shall see if they are so indifferent in the treatment of patients.

What does Pinel see in the intermittent fevers, as understood in our country? A form, a febrile type—nothing more. These fevers, for him, do not differ from the continued fevers of his pyretology except in type, "ordo intensionis et remissionis" (Galen) ; they have the same proximate causes or the same nature, which to a good nosographer means the same group of symptoms and the same denomination ; a simple variety of the continued fevers is made of them ; and if by chance such fevers changed type without changing nature, and became continued without differing *toto cœlo* from continued fevers proper, what would become of the variety? It would re-enter into the species, for the credit of the method. Is it not the object of diagnosis to classify diseases?

But we must enlarge the plan of this question beyond the circle of pyretology.

The type is not the disease ; for all diseases are susceptible of assuming the same type. Conversely, the most various types may be symptomatic of the same disease, in one or in different patients.

The type, be it intermittent or periodic, belongs essentially to the organism, and not to the external cause which acts upon it. All types

are observed in the physiological order. Pathology reproduces them in connection with the spontaneous or essential affections, the principle of which is simply the innateness of morbid properties, obeying the same laws as the physiological properties.

Though it be exact to say that certain morbific causes are much more frequently manifested than others under a given type, this proves only that they have the faculty of exciting it more particularly, even of soliciting it with a constancy and regularity which are very often periodic; but even when such an effect does not depend in part upon some circumstances foreign to the nature of the morbific agent, it is not necessary to infer that the type is a necessary result of the impression made by the agent, and that the latter produces it as surely as fire produces heat.

The confusion attributed to Pinel seems the less excusable, as he evidently felt the truth which we have just stated, while sacrificing it to the puny exigencies of his method. We shall hereafter try to reach the source of this strange contradiction.

Cinchona, that wonderful remedy about which, for two centuries past, so much has been written, and too much cannot be written, has several modes of action, according to the doses in which it is given. But independently of this, it seems beyond a doubt that among its precious properties there are two which chiefly distinguish it. The first and the most heroic is that which it exercises upon diseases produced by miasmatic infection, under whatever form and type they may appear. The second is that of modifying or suspending the intermittent type of diseases whatever may be their determining cause, and especially when this intermittent type is at the same time periodic and regular.

In the observation of these two very distinct sorts of effects there is a touchstone very fit to resolve the difficulty which we have just brought up against the nosographists. In fact, if cinchona, given in the periodic intermittent affections which have no relation of nature and cause to those which originate in the miasmatic affection, suspends or modifies the periodic affection without curing the disease of which this type is symptomatic, it is necessary to conclude that it enjoys (as has been very well said) a general antiperiodic virtue. And if, on the other hand, when given in periodic intermittent fevers produced by the special marsh poison, it not only suspends the febrile attacks, but at the same time destroys the disease of which they are symptomatic, it seems to us that we ought to draw the other inference, that in the latter cases it manifests something besides an antiperiodic action, namely, a virtue remarkably contrary to the special diathesis contracted by the organism under the influence of marshy emanations. This last conclusion would be rigorously legitimate if observation showed that cinchona cures miasmatic fevers, not only when intermittent, but also when continued; and it would be still more so if facts proved that the paludal cachexia and the material lesions which it causes yield to cinchona like the intermittent fever itself, of which they are too often the fatal termination.

Here are certainly two very different kinds of action, if we consider the result; but if we interrogate the cause, we shall perhaps find that they do not necessarily presuppose a distinction in its fundamental action. Whether intermittent, remittent, or continuous, paludal affections do not differ essentially. The type has its causes in the laws of life; and the latter presents all the periodic modes in the regular fulfilment of our functions.

On what, then, can this remarkable difference in the action of cinchona depend, which now takes away the form and the basis, and now suppresses only periodic manifestations of symptoms, leaving in its living entirety the inner tendency to reproduce them?

It springs from two causes, the one real, the other only apparent. It is real and positive, that in a great number of cases where the paludal infection is neither old nor profound, and which manifest themselves in the form of legitimate intermittent fevers, cinchona, given methodically, often takes away the basis of the disease with its form, the inner principle of the attack with the attack itself. But what follows? That cinchona has destroyed the paludal miasm immediately in the manner of a counter-poison? Nothing proves this, and all seems to unite to prove the contrary.

The paludal impregnation of the system is exterior. With whatever facility the pathological assimilation of the miasm may occur through the morbid properties of the system, and however little analogy there may be with poisons properly so called, this agent is not a morbid poison; or, at least, it does not seem to be one of the morbid poisons of man, for it never develops itself in us in the absence of the well-known external conditions in which it ordinarily originates. It ought to be, consequently, less adherent to the constitution than the diseases such as gout, syphilis, dartre, etc., which spring spontaneously from our depths as products of that which is originally morbid in us. It follows that if the paludal affections are recent, slightly identified with the system, intermittent, and particularly if regularly periodic (a sign of slight infection which has not produced cachexia), cinchona, in suppressing the periodic symptoms, that is in fortifying the vital resistance against the return of the febrile access, will give to the system the force and the time necessary to overcome the deleterious power of the miasmatic principle. Everybody knows that many simple intermittents recover by themselves without the aid of cinchona. And how often do we see intermittent fevers, even apparently the least ancient and the least profound, suppressed at first by the bark, then relapsing with discouraging obstinacy in spring or autumn under the influence of taking cold, of an emotion, of an intercurrent malady, and thus throwing discredit on the professed specific virtue of the febrifuge!

"In fact nothing happens here except what happens in the periodic symptoms of gouty, rheumatic, or other sorts; and if the latter yield less readily and relapse under the same form or another type with much more tenacity, it is because the gouty diathesis, for example, is wholly personal

and inseparable in a way from the constitutions wherein it is developed, while the paludal affections are accidental and essentially curable. To this we reduce that occult virtue, that celebrated specificity of cinchona in intermittent fevers. It is no more the direct antidote of the paludal principle than of the gouty principle.

Such is the thought which one of us expressed in the following terms in another work ("Les vrais principes de la matière médicale et de la thérapeutique," par M. Pidoux; Béchet, 1853, p. 30):

"If cinchona cures paludal periodic symptoms more certainly than gouty symptoms of the same type, it is because gout is an intimate and personal disease, identified in quite a different way with the organism, and quite otherwise rebellious than the paludal poison, which is wholly foreign and strange.

"When an affection is not deep, when it has not yet taken a strong possession of the system, when it has not sufficiently assimilated the healthy forces, it has the greatest tendency to assume the intermittent type. This is nothing but a more or less regular alternative of healthy and of troubled moments, an evident sign that the disease, however dangerous it may be in one of those moments, has not yet wholly vitiated the system. Cinchona, then, given in the intervals of the accesses, increasing the vital resistance of the healthy forces, prolongs the healthy moments, and is able to place the system in a position to use the principle of the disease, to dominate it and let it go out, unless it is of a nature too vivacious, too constitutional and too intimate. Such is the case with the paludal affections, when they have not yet profoundly altered the system and produced too grave cachexia and disorders of the viscera.

"When these profound effects have been accomplished, wherein is cinchona much more wonderful than a great many other reconstituants? Is it not then confounded with all the tonics, though still supreme among them? Do we not often require to aid its action by that of the alterants, etc.? Are not our hospitals full of soldiers and colonists from Algiers, living opprobria of cinchona? The drug has cured them twenty times; perhaps it has snatched them from death when their disease, though horribly deleterious, was still superficial and the system slightly infected. At present it is important because the living body is all disease, and, having reached that hectic state in which its basis is no longer sound, it can no more lend a fulcrum to an artificial than to a spontaneous cure.

"No remedy makes more potent appeals to nature than cinchona. So true is it that it acts only through nature, that the very properties which are attributed to it are those which characterize the regular action of the system, properties which are transferred to cinchona by a figure of speech which specialists alone take literally.

"To increase the healthy force and lessen the morbid, is the general property of cinchona. Its tonic property, or the faculty it has of increasing the common vital forces, is proved by its sedative, moderative, and regulative virtue relative to the special manifestations of this force.

"Barthez said, in his ontological language, that it increased the forces in power, and restrained the acting forces. According to Hunter, it is the remedy for irritability, a morbid state characterized by diminution of force and excessive and irregular increase of action. Gangrenous inflammation, in which, according to the same author, the excessive morbid action is not in proportion to the common vital force, which has very little resistance, presents the truly special indication for cinchona. What do we see in all this? The exercise of the general laws of the organism. But if these are the laws of the organism, they are not those of cinchona.

"Nevertheless, in certain circumstances, the organic forces are affected by pernicious influences which more and more subdue their power of resistance. To these pernicious influences, cinchona offers an opposition. Does it neutralize the paludal miasms of itself, directly and chemically? Not in the least. First the paludal miasms, once absorbed and at work, are no longer foreign bodies. They live in the sick organism; and the affection, the attack of fever or any other of its manifestations, is itself nothing but this accidental and abnormal life. Finally, the organism includes all the faculties which are to be developed in it by cinchona; it only needs food for them. Under this appropriate influence, it by itself will draw its properties from the salutary bark, but not without conceiving them and impressing upon them an activity of a superior order; for in order to act they must be living. The heroic element, then, will not be pharmaceutic cinchona, but cinchona vivified, or the organism fecundated by cinchona in its power of vital resistance and unity.

"Is there a remedy less specific, in the empiric sense of the word? Is there one which acts more conformably to the principles of the Hippocratic vitalism? I do not think there is.

"Here again, let us not tire of remarking that the virtue of cinchona, like that of mercury, scarcely goes further than the sensible lesions of special functions, or than symptoms. It protects life against mortal violence; but it does not destroy the paludal affection radically, any more than mercury does. When it has produced a grave and deep impression, when the system has been saturated with it, the memory is retained during the whole life. We must not think that this syphilitic or paludal saturation demands as its cure the mercurial or quinic saturation, and that we can conquer the one by proportioning the other to it. This is the necessary consequence of humorism and chimiatria, and practice regrets it daily. With mercury and quinia organisms are tortured, which are so infected, reduced by the disease to so profound a cachexia, or so indisposed to consent to the remedies (and these subjects are common among those whose nervous system is habitually overexcited by intellectual labor and moral affections), that there is nothing in them but irritable tissues which exaggerate their physiological action, or a cacochymic organization, which has scarcely any sane elements capable of conceiving the therapeutic action. Is there a more decisive proof that the remedy acts only by itself? If it

were so, would it not suffice to make the dose of the remedy equal or superior to the disease, in order to neutralize the latter?"

Let us now enter upon some practical generalities regarding the indications for cinchona in non-paludal periodical diseases, and next in the paludal, under various types.

There is no doubt that the periodic type is observed in a multitude of chronic affections very distinct from the paludal class, and that cinchona modifies or suspends this symptom without affecting the nature of the morbid state thus manifested; and this is shown expressly by the course of gouty and rheumatic diseases. Let us also call to mind certain facial neuralgias which are wholly independent of paludal disease, and which, when their attacks are regular, have perhaps no more potent curative, or at least palliative modifier than sulphate of quinia. If these facts were rare or contested, we should think ourselves obliged to furnish examples. Our only difficulty is to chose among them.

Migraine is also often periodic, but the attacks are generally too wide apart for us to think of using sulphate of quinia. Nevertheless, we have seen it given in a very regular eight-day migraine. The result was to prevent the development of the access, but with an injury which curiously confirms our thesis. The patient was forced to abandon quinia with its benefits, on account of a most distressing malaise, which did not cease until the quinia was stopped, when she had an attack of more than ordinary severity; as if the trouble, too long compressed in its manifestation, had accumulated itself in her, and had given in one single attack the sum of those which had previously developed in succession, and so to speak, in detail.

Here appears, with all its importance and truth, the distinction which we are laboring to make between the type of diseases and their nature; the action of cinchona as a means of analyzing these two pathogenic conditions, cannot be controverted.

We have seen this fact reproduced in a facial neuralgia, and still more plainly in an epilepsy, the attacks of which, retarded by sulphate of quinia, were at last terrible when they exploded after a compression of greater or less duration.

We have treated, in the course of a year, two intermittent urticarial fevers, one quotidian, one tertian, both with accesses toward evening. The patients never had been exposed to the action of paludal miasms. Bleeding and evacuations were without appreciable effect. Sulphate of quinia had an immediate and complete effect. Nothing is more decisive than these examples.

If we had space, we would gladly speak of the antiperiodic action of cinchona in the quotidian intermittent fevers which are common in pulmonary phthisis at the commencement of softening of the tuberculous matter.

It is certain that this fever is, in a good many cases, intermittent in its first accesses, that it becomes remittent, and then continuous with ex-

acerbations in the evening. We are able to prove by repeated facts that the attacks, sufficiently frankly intermittent at the outset, can be very sensibly modified; that the first doses of sulphate of quinia sometimes suppress them for several days; that more frequently they are moderated, shortened, retarded, or one of the stages is taken away, as that of chill; or the heat is very moderate, the sweat hardly felt, etc.; in short, that they are evidently influenced by it. This success has not lasted long when the softening goes on rapidly; the attacks often reappear, obstinately resisting all action, especially when the fever passes the remittence and continuity, while this circumstance is indifferent in fevers of paludal origin.

We have often observed that the intermittent and periodic affections, which are connected with an immovable organic lesion or to the continued presence of a material cause, are very susceptible of being modified, or for an instant suppressed, or deranged by sulphate of quinia; but that decidedly suppressive effects are not then obtained from it. It even happens too often, in these various cases, that its action is completely negative, and that its virtue does not overcome the power of the cause of the symptoms.

In chronic diseases the physician is rarely in danger of taking symptomatic or idiopathic affections for masked symptoms of marsh diseases. It is otherwise in acute diseases or fevers, where the mistake is easier.

We admit that, among these diseases, those which, in our hospitals, and in France generally, present the intermittent and periodic type, especially the tertian or quartan with perfect apyrexia, belong, in the very great majority of cases, to the marsh fevers. There are other signs than those derived from the type which may give character to this class of fevers, and these signs are, in our opinion, more pathognomonic, more real, more profound, since in certain regions nothing is more common than to see paludal fevers taking the remittent or even the continued type without losing their nature. Quite on the contrary, it seems that then the disease is only more declared, more complete and better formed; for it is in such cases that the essential marks of which we speak exist in their highest degree.

By way of opposition, it is not very rare to meet intermittent fevers, which have no connection with miasmatic fevers but the type.

From 1856 to 1862 not a spring passed without our observing several cases of the fevers called vernal, usually of the tertian or double tertian type. We were unable to regard them as produced by marsh-poison, and for good reasons. The patients either had never left the healthy quarters of Paris, or had never lived in countries where marsh fevers were epidemic. These fevers almost always had a more or less marked inflammatory expression. As to their nature, they might much more readily have been confounded with the simple synocha of the old authors. They never showed the tint of complexion peculiar to miasmatic intermittents, nor hypertrophy of the spleen. Diet, a little bleeding, etc., a few days of rest, and they readily pass off, and do not return. But we think we are sure

that we have sometimes cut them short with 30 or 40 centigrammes of sulphate of quinia (gr. 4½—6), and thus shorten their duration.

The daily intermittent and remittent type is especially peculiar to catarrhal fevers. Sulphate of quinia in these cases is not able to prevent the fever from developing and becoming continued, exacerbating and paroxysmal. It may even be very harmful, as it is at the beginning of certain typhoid fevers which are very insidious through the very marked quotidian intermittent type which they take at their invasion. The untimely administration of sulphate of quinia stimulates the system dangerously, irritates the digestive tube, kindles the fever into fresh heat; and in spite of the success recently ascribed to its use in large doses in typhoid fever, we have always found it hurtful, in those exceptional cases where, by inevitable error or by inattention, we gave it at the beginning of this fever.

But it is otherwise toward the end of catarrhal and typhoid fevers, when convalescence is retarded by the persistence of the fever in a degenerate intermittent form more or less regular. A few grains of sulphate of quinia are then indispensable, and have a sure effect in cutting short this declining access. What relation is there between the nature of these fevers and that of marsh fevers?

It has been shown that the intermittent and even periodic type belongs to a great number of diseases both acute and chronic; that fevers may accidentally assume it, while chronic affections, as neuralgias, the neuroses, hæmorrhages, whether essential or connected with some organic lesion, very often borrow this type. We have tried to prove that, simply because they revealed themselves thus, cinchona might modify that part of them, without possessing the least appreciable action upon their special nature. If it were otherwise, this remedy, already so precious, would replace the whole materia medica, and would really justify the title of panacea. It is really nothing of that sort. We know that it has been largely praised as a remedy for gout; but it suffices to recollect that of all diseases gout is perhaps (next to the paludal) the one which most frequently affects the intermittent course and the periodic type, in order to understand at once what sophism may be contained in the general assertion we are denying. One of its forms is efficaciously modified, and we think the bottom has been reached. Who would dare to claim to cure gout with cinchona? We do not, then, consider it as antiarthritic, nor as antirheumatic, antituberculous, antipurulent, antidartrous, etc., etc.; but only (and this is much) as an antiperiodic, unless some grave lesion, incurable or irremovable, opposes too much the action of this useful property upon the organism.

As exact as our statements upon the antiperiodic efficacy of cinchona seem to us, so unjust does it seem to allow it any other. The property which we have just ascribed to it is a very general one, and its title of specific remedy is not due to it. This new virtue would be as circumscribed as the former in general. It would only be exercised upon a well-determined group of diseases which, under whatever form or type they

appear, are radically of the same nature, and have the same special cause; we mean disease originating under the influence of marshy emanations.

Certainly (and we have already said it) when these diseases take the febrile form, and especially when they take the febrile intermittent type, they observe it with a regularity, a fixity, an order, so constant and calculable, that it has been thought that this type, form, and order, were essential to them. As we are not now making a nosography of the intermittent fevers proper, we have no more to say of the type, and we repeat only one thing, to wit, that the distinctness of their stages is no less distinctive a character of these fevers than the clearness of their type, and that in want of diagnostic data drawn from the order of succession of the symptoms, there are, in the special changes produced in the organism by the action of these diseases, a collection of signs much more pathognomonic of the true nature of the affection than the variable and common symptomatic expressions upon which the nosographers, especially Pinel, have based their descriptions and classifications. The reason of the preference given by them to symptoms over the characteristics suited to distinguish these affections more radically proceeds from the scepticism which by degrees has led minds to the abuse of humoral theories, the abuse of the study of proximate causes and of their mode of action by coarse explanations drawn from physics and chemistry. Because the organic phenomena did not suit explanations drawn from physical and chemical science, it was concluded that it was impossible to know them otherwise than as the herbalist knows plants, that is, solely by the number and grouping of their external characteristics. These diseases were made and named, and in medicine the science of the classifying botanist was accepted as sufficient.

This labor is continued to-day in the same spirit, but with other instruments. Instead of establishing the natural history of symptoms, that of morbid lesions and products chiefly is drawn up, not as Sauvages did "juxta Syderhamii mentem et botanicorum ordinem," but "juxta chimicorum mentem et anatomicorum ordinem." Not everything can be done at once, and each epoch has its task.

The history of the paludal diseases was more advanced under Morton, Torti, Lautter, Lancisi, Starck, etc., than it was twenty-five years ago. Pinel and Broussais tore this great page from nosology.

For some years it has been replaced; we owe this chiefly to our conquest of Africa. We were able there to escape from the tertian and the quartan, to free ourselves from the nosographic prejudice of type, and thus to re-enter upon a grander road for pathology, and a straighter and more practical one for medicine. In Algeria we saw types effaced and confounded, and our classic intermittent fevers changed to continued, as if to mark the vice of a pyretology exclusively founded on the consideration of type. There we learnt more, not about intermittent fevers, but about miasmatic diseases. There, too, numerous and sad occasions offer them-

selves for learning that cinchona is not only an antiperiodic in general, but a special remedy for paludal diseases of any type.

How have the followers of nosography been able to deceive themselves so long? Did they not admit in 1821 that intermittent fevers sometimes passed to the remittent type, without being the less susceptible of cure by cinchona? What, in truth, is a remittent fever, even as regarded by the superficial pyretology of the school, except a continued fever? Is not the febrile state continuous? And what matter that it has remissions and exacerbations, if, as everybody admits, the continuous fever is a conventional type? And if remittent fevers *a quinquina* differ from the continued non-miasmatic fevers as much as gout differs from scrofula, it is certainly in points of very different importance to that of the type. We do not deny the existence of such points, but we deny them the first rank, which we wish to see filled by more fundamental nosological conditions, more akin to the therapeutic indication.

Perniciosity, if we may use the word, depends much more upon the pernicious nature of the disease than on the pernicious trouble which may be caused in the system by the affection of an organ which is indispensable to life. In certain cases of anomalous and intermittent gouty affections, the organs which suffer, and with which the chief symptoms are associated, are surely very noble organs and very important centres of life; nevertheless, such attacks rarely cause death, as those of miasmatic pernicious remittent do, even when they strike less important organs—as the stomach, in pernicious cardialgia, the large intestine in the dysenteric form etc., not to speak of the ardent and the algid, which never appear without attacking some organ in particular. It is malignity, that is the *insidious imminence* of dissolution, and sometimes the very absence of bad symptoms, that constitutes perniciosity, and not the intensity of functional troubles of one or another special organ. The organism is then in much more danger from the attack on its vital unity and resistance than from the structural lesion of one or another tissue.

This is not idle, but serves to confirm the ideas which we sustain touching the nosological pre-eminence of the proximate cause of the accidents over that of their form and type. There results this important therapeutic precept, that, in a *miasmatic* pernicious fever which has reached its second or third access, we must not wait for a remission, which perhaps will not come, but that cinchona is urgently required in the middle or even at the opening of the access. The contrary prejudice has been promulgated by the nosographers, it is easy to guess why; but we take a contrary ground, and believe that in these diseases the diathesis leads the type and is more considerable, especially under the practical point of view; we rest on facts of decisive weight, in which attacks, probably the last, have been shortened, attenuated in their violence and danger by large doses of sulphate of quinia; and for these reasons we conjure practitioners not to await apyrexia or remission in such cases. When cinchona is prescribed as an antiperiodic, it is a different case; and it is reasonable to

give it only in the intervals. But when it is given as a febrifuge, the case is otherwise, especially when there is the least possibility that the existing access may end fatally. It is thought that the action of cinchona is slow to be felt; this is a grave error. Given as a febrifuge, in marsh diseases, it acts with a surprising rapidity against this poisoning. It is then proper to give at least twice the dose which would suffice to cure our legitimate tertians. Facts show that the more continuous a paludal disease is, the larger the doses of sulphate of quinia must be in order to conquer it. We know that pernicious miasmatic fevers, at first intermittent, become remittent and subintrant in proportion as they increase in intensity and gravity. The nosographers, who were not ignorant of this, persisted, and still persist, in their system of type and intermittence; yet they tell us constantly that they are exempt from theories, preconceived ideas, and doctrines.

In saying that they were not ignorant of it, we mean that they ought not to have been ignorant; for when we consider how much a slight preoccupation, by preventing attention, prevents sight and comprehension, we shall understand how their eyes failed to see, and perhaps do not see to-day, that fact of the continuity of intermittent fevers, though it be firmly based on the entire medical tradition, and the clinical observations which Paris itself offers to those whose mental gaze is unconfined. The continuousness of intermittent fevers! What proves better than this inevitable logomachy the vice of classifications which are founded on characteristics so mobile as the type or the symptom? Our prejudices are often so much clearer than evidence, that a physician who has made a valuable treatise upon the paludal fevers of Africa (M. Maillot), after recognizing that these fevers there incontestably affect the continuous type, proposes, by way of distinguishing them from our continued fevers proper, the denomination of pseudo-continued. If we consider one of these latter and one of our typhoid or puerperal cases, which ought we to call "pseudo-continued," judging from the type alone? A docile pupil would be greatly embarrassed. It is as if a physician who had never practised except in a latitude where marsh fevers approach the type of continuity rather than that of remittents, should propose to call the miasmatic fevers of Northern France "pseudo-intermittents." He would be authorized to do so by the example of Maillot, and both would be acquitted by the nosographic philosophy.

Boudin has forcibly noted all these faults of reasoning in a very original work ("Traité des fièvres intermittentes, rémittentes et continues des pays chauds," etc.). His views are still further developed in a second publication entitled, "Essai de géographie médicale."

In order to fill up the proof of these different assertions, it is now necessary to give examples of continued miasmatic fevers cured by sulphate of quinia.

These cases are not rare since our conquest of Algiers. Boudin and Maillot quote an abundance. Many examples are found in the fifty-second

volume of the "Recueil de mémoires de médecine, de chirurgie et de pharmacie militaires" (Documents pour servir à l'histoire des maladies du nord de l'Afrique, par M. le docteur Laveran).

This form of paludal fever is becoming rarer in Europe, but Southern France presents tolerably frequent cases.

If the range of action of our tonics is relative to the form of the entire disease, it is also notably relative to the form of each access.

The organism affected by the same morbid cause does not always react in the same way to that cause. Suppose three persons exposed to the effluvia of a marsh. The cause is the same ; and in each an intermittent malady, identical in nature but different in form, will declare itself. We shall observe in one a form which will be called *legitimate* intermittent fever, in another, *masked*, in a *third*, *pernicious*.

The first deserves the name of legitimate, because the system has reacted by a general and regular fever. The vital resistance has received a direct attack, but the synergies have not been broken, and there has been no ataxia. On the contrary, the reaction has been manifested by well-proportioned, simultaneous phenomena, calculable, critical, like all which are produced by the totality of the vital functions, of those general functions by which every animal lives and preserves itself by means of an incessant reaction against all harmful influences. Against this form of intermittent affection the radical tonics display their most constant and surest effects, because nature departs less from her habits, her normal ways, and requires, so to speak, but little aid to return to them. The effects are successful and prompt in proportion as the intervals which separate the attacks are equal and prolonged. A tertian fever is suppressed more promptly and easily than a quotidian, and a quartan more so than a tertian. It seems that in the former the tonic has not time to impress vital resistance upon the system and to fortify it against so near an access. The disadvantage has its compensation ; for, if a quartan is suppressed more easily than a quotidian, the latter when driven off is infinitely less liable to return than the quartan, and we are not obliged to continue the preventive doses of bark as long as is mentioned under the article Cinchona.

In masked fever, nature takes the mask of another disease. She does not react by the total of the vital and natural functions, but by some special organic action, for example, a local pain, an isolated functional trouble, etc. This anomaly, this cause which declares its existence by effects, *prætor rationem*, generally announces a more tenacious and obstinate affection. The cause is the same ; but the system replies to it differently, abnormally, and it will be harder to master, because, independently of the enfeebled vital resistance which needs support, there is a special lesion existing in virtue of a predisposition which may be very ancient and rooted, upon which the tonic will often fail to act. In the former case there was order in disorder, a tendency, salutary efforts, and this was a guaranty of a more simple affection, a greater ease of re-estab-

lishing the normal state. In the present case there is an odd localization of the morbid affection. It is not an uprising of the entire economy with co-ordinate efforts: it is a nerve-suffering, a special function perverted; there is required a more powerful and sustained therapeutic action.

This is proved by facts. Triple or quadruple doses of cinchona, given with inconceivable patience, are needed to overcome a masked fever; and also, a very persevering prophylactic use of the same remedy.

Sometimes, after several attacks of the masked form, which has resisted cinchona, or has only partially yielded, the system reacts by a general fever; and then, in confirmation of what we were just saying, the malady obeys at once very moderate doses of the febrifuge.

Pernicious intermittent is very often confounded with masked intermittent, and this error is committed when the special symptom which constitutes the masked form assumes considerable intensity and seems threatening. It is well to know that the fever remains masked as long as it is confined to the production of a special isolated trouble, in which the radical forces of the system take no part, and while the general synergies are preserved, whatever be the alarming intensity of this local symptom.

Perniciosity, as above said, exists when along with one or several special functional troubles (the concomitance of which is not necessary), there is a rupture of the synergies in the common vital functions, a tendency to direct extinction of life, an insidious threat of death.

Here the radical tonics, as cinchona, possess all their wonderful efficacy, and, what is worthy of remark and very distinctly confirmatory of our former views, they possess them with the mere certainty, in proportion as the resolution of the radical forces affects the common vital functions without special functional lesion, as in algid, lypothymic, sweating, pernicious fevers, etc., in a word, when it is only necessary (as Barthez says) to give vital resistance to the radical forces of the system.

The therapeutic power of the radical tonics varies much according to the nature of the cause of intermittent and malignant diseases.

Thus, those which are due to marsh miasms, cœteris paribus, yield much more readily than those which develop without known cause in nervous persons, in great cities. The latter are also in general much more irregular in their symptoms, their type and their course; which gives a last support to the opinion which we just now presented. This point of practice is so difficult and so little known, that we should be sorry to leave it. There are a multitude of delicate distinctions, which are notwithstanding very useful; and this is what encourages us to unravel this matter with more care.

The periodicity of the attacks, their very complete intermittence, the success of sulphate of quinia, do not suffice by themselves to characterize a true masked fever. It is so common to see at Paris facial neuralgias in persons who were never exposed to paludal influences, taking the periodic form and yielding to the action of the salt of quinia, that it would be

false to conclude from the aggregate of these signs that there was a marsh fever masked under the symptoms of a temporal neuralgia.

When any neuralgia is periodically intermittent, moderate doses of sulphate of quinia very commonly cut it short. When it is periodically remittent, the doses must be larger. When it is continuous with irregular exacerbations, it is necessary, in order to obtain therapeutic results, to increase the dose until it produces the physiological effects upon the nervous system, such as ringing of the ears, deafness, stupor, and sometimes delirium. It is worse than useless to go so far. A little noise in the ear, a slight stupor, retarded pulse, such are the limits of the physiological effects which should never be exceeded. But unhappily, the advantages which have been derived from the use of quinia in diseases foreign to paludal influences have been paid for with sad sacrifices. We could easily quote papers on the use of the remedy in acute rheumatism, which are much more worthy of figuring in a treatise on experimental pathology than in a work on therapeutics. But Legrou has recompensed us for these extravagances by researches in which the wisdom of the physician has always directed the hand of the experimenter. Toxicology has not gained thereby a new chapter, but the treatment of rheumatism has gained a new resource.

Periodic facial neuralgias are nowhere more common than in countries which are cold, moist, and marshy at once. Masked fevers are not most often found in those which are at once warm and marshy. In regard to the pathological forms due to the action of miasma, the marshes are properly divided into those of hot, those of cold, and those of temperate countries.

The paludal diseases of southern countries are the severest of all; it is there that perciniosity is oftenest observed, and that variety of dangerous symptoms manifested by the endemic pyrexia which are dreaded by man and fatal to almost all non-acclimated living beings. It is there that, in virtue of the intensity of the infection, fevers take a continuous type, degenerating into dysenteries, cerebral affections, phlegmasiæ of the liver, and that those almost incurable diatheses are contracted which modify the symptom so profoundly, that it seems no longer fit to receive the impression of other morbid causes and to manifest certain other diatheses.

But it is also very remarkable that it is not in the marshy countries where grave fevers prevail that we find those periodic facial neuralgias called masked fevers, which are so surely broken up by sulphate of quinia well administered. They are specially observed in two circumstances.

1. As remote effect of a moderate paludal affection contracted previously. It is thus that they are not rare in persons who, having lived in temperate marshy climates and contracted intermittent fevers, or not, afterwards come to live at Paris. The influence of moist cold, in this case, has the very certain power of bringing out those paludal morbid reminiscences masked under the form of rheumatism. This association of two

pathogenic influences in producing a mixed affection shows a certain degeneration of the morbid state produced by the marsh miasm. The efficacy of sulphate of quinia is inversely proportioned to the antiquity of the miasmatic influence and the degeneracy which this impression undergoes in the system. It is with this diathesis in relation to the therapeutic value of cinchona, as it is with the syphilitic in relation to the curative virtue of mercury.

2. Paludal affections are also often masked under facial neuralgias, especially the supraorbital and the ocular in countries which are very marshy and moist and cold, where the constancy of the cold and damp has almost as great a part as miasma in producing endemic diseases. We might mention certain parts of the department of Eure-et-Loir, where we have made this general observation. In this region, muscular rheumatism and neuralgia are excessively common, and in particular periodic neuralgias of the face. For our part, we believe that moist cold has more influence than marsh miasm in the production of these neuralgias, and we hardly dare to call them masked fevers. Nevertheless, if it is moist cold that produces these affections, it is very probably miasmatic action that gives them the intermittent type.

Once more, an intermittent facial neuralgia does not suffice to constitute a masked fever. What then is wanting? It is necessary that in a circumscribed point of the system, in a living part, as small as may be, in a nervous branch, for example, the whole apparatus of an attack of fever should be included. It is necessary that the specific morbid form which is manifested commonly by this synergic shock of the whole vascular system which is called an access of fever, concentrating itself in one point of this system, should be there represented specifically, that is, by phenomena analogous to those which it would have caused if it had taken its ordinary form. More is necessary, for all the phenomena of a local fever may be manifested in an access of supraorbital neuralgia without its receiving the name of masked fever, that is, without being symptomatic of a paludal affection. Still, it must be admitted that these signs of a local fever associated with neuralgic pain, the chemosis, the continuity of the attack, the febrile pulsations of the arteries of the eye, especially if there is a little chill at the beginning, and if the intermittence and periodicity are frank and perfect, and of the tertian or double tertian type, etc., are in favor of the existence of a masked fever. But the further one gets from the period at which the miasmatic influence has been felt, the more time the resulting affection has had to grow weak and degenerate, by itself or by the action of other morbid tendencies, the more we shall see this clearness of type, stages, and symptoms losing itself, and the less decidedly curative will be the treatment by quinia.

If, on the contrary, the masked fever is in all its purity, if it declares itself under the immediate influence of the paludal miasm, there will be in the special grouping of its phenomena characteristics which may perhaps exhibit its nature to a wise observer, even should he have in forming his

diagnosis neither the data of etiology nor the knowledge of the type of the morbid symptoms. In this case the access which is masked by a neuralgia does not separate itself completely from a certain stamp which the paludal principle fixes upon the aggregate of the symptoms as well as upon each separate symptom, even though there were but one of them; as we see small-pox marking with its characteristic impression each of the morbid phenomena which it produces. A practitioner who is familiar with marsh fevers often does not require, in order to recognize an intermittent fever of this sort, to know either the type or the antecedents. He may even dispense with exploration of the spleen, and be able to state whether the fever which he has before him, we will suppose in the fully developed warm stage, is a marsh fever or any other kind.

It is not our intention to trace here these common characteristics which make special all the symptoms of paludal affections. We will confine ourselves to stating this unexplored point in the history of marsh diseases, and to saying in particular that paludal neuralgias or masked fevers do not escape this law, but manifest it much less when they are contracted in countries where the miasmatic influence is plainly associated with the action of moist cold, fruitful of rheumatismal neuralgias, and also when the paludal diathesis has been attenuated by time and altered by other diatheses.

One word more upon the pathological results of the paludal diathesis, and the limits of action of sulphate of quinia.

There are three general diseases in which we have therapeutic resources which are certainly wonderful, but whose limits ought to be understood.

We readily become accustomed to considering the treatment of syphilitic diseases as exempt from difficulties, mistakes, and failures, because of mercury; that of chlorosis and its numerous attendants, because of iron; that of marsh diseases, because of cinchona.

Here is a triple illusion. We will note very briefly the circumstances in which cinchona loses all its power.

It is a great mistake to think that the paludal diathesis has completely disappeared when its primary manifestations have been driven off by cinchona, as it is to believe that constitutional syphilis is eradicated when mercury has cured the syphilitic symptoms, or to believe in the cure of the chlorotic disposition when its external signs have been made to disappear by the use of iron.

When the action of the paludal miasm has been long and intense, has had time to modify the system deeply, cinchona has been able to destroy the fever, to disperse the swelling of the spleen, to snatch the man from a certain and imminent death, by removing forever the pernicious symptoms which without it would be inevitably fatal; but it is not given to it to erase the impression, usually ineffaceable, which the deleterious agent of the marshes leaves upon the animal system. It is in these cases that, even if withdrawn from the miasmatic medium, the system is tormented in a

thousand ways by degenerated paludal diseases, which are rebellious to all other remedies but cinchona, and too often to cinchona itself. This at first moderates them, but they soon spring up again, and soon it is powerless against them. At other times very long intervals have elapsed since the last attacks of marsh fever; nothing more is thought of them; the patient thinks himself fundamentally delivered; but let any acute disease spring up, and it will affect a remittent type, and sometimes be attended by pernicious symptoms which put the physician to rout unless he knows the antecedents of the patient, or if, knowing them, he does not associate with them the unusual phenomena which are before him. But if he establishes this relation and acts upon it, he saves his patient; but the latter cannot subsequently have a disease, or come under some active exterior influence, without the symptoms of the disease or of the influence being complicated by accidents which attest an old affection that is aroused at the least shock, and becomes less and less susceptible of modification through cinchona.

What we have said in general of the refractory and indelible character of the paludal diathesis is often found in the neuralgias which depend upon it. These affections at last defy sulphate of quinia, and woe to the patient whose physician then tries to overcome this insurmountable obstacle! In certain nervous constitutions, all the energy of the remedy passes to the disease and seems as if employed to exasperate the pain; the symptoms become continuous, a general and febrile nervous excitation arises, sleep flies, the digestive canal is revolted, and the patient, a genuine *noli me tangere*, is inaccessible to any other therapeutic modifier, so powerful is the one which has been abused!

But the specific tonics are not exclusively indicated in the intermittent affections, malignant or otherwise.

All the morbid states, even if continuous, that present the characteristics we have ascribed to malignity, to ataxia, require these therapeutic agents. But unhappily, their virtue is not so constant and infallible in these cases. This is perhaps due to the absence of the repose of the system which is one of the conditions of their action: but much more probably to the nature of the disease.

Nevertheless, whenever the causes of these malignant continued diseases have primarily enfeebled the radical forces of the system, and do not consist in poisonous and septic matters introduced from without or engendered by the organism; whenever these causes act at once on the nervous system which governs vital resistance and the synergies, the specific tonics will possess an efficacious energy.

These morbid states may be primary, and constitute the whole disease, as in certain ataxic nervous fevers developed by very active moral causes, etc., in a deeply debilitated system. More frequently they complicate other diseases, as is seen in patients with hospital gangrene, or in those who, during the course of traumatic symptoms, are affected by new and painful ones, or who, having been deprived of their senses by a wound for

a considerable time, recover to find themselves mutilated, or slaves, or devoted to shame, etc.

It is very important to distinguish the morbid states with malignity due to these causes, from those which often develop in the midst of the same diseases, but under the influence of other causes. Such, for example, are the ataxic symptoms which complicate large suppurating wounds; or those seen in typhoid fevers, which constitute the so-called ataxic form of these grave affections.

To all the malignant symptoms determined by this sort of causes we may apply that which one of us said of the use of tonics in the ataxic form of entero-mesenteric fevers (*Journal des connaissances médico-chirurg.*, t. III., p. 154): "The ataxic sort is of all the most fatal. The fever in this form is replaced or accompanied by nervous symptoms which, like the simple neuroses, no longer yield to simple modifiers of the nervous system, but which, maintained by a course which it is not in our power to neutralize, persist and kill, unless the system re-enters into that form of febrile reaction which is compatible with a favorable termination."

Nevertheless, it is not impossible in this case to obtain some advantages from the action of radical tonics; but they must be used as fortifying remedies, a mode of action which is not included in this section, and of which we shall speak presently. It is very certain, also, that they then serve to fortify the nervous system and to restore it to its co-ordination and relations.

The property possessed by cinchona of fortifying the system against the pernicious influence of paludal miasms, is an entirely different thing from its power against morbid poisons. There are some, against whose deleterious effects it has no power; such are those which individualize themselves strongly in the system, or which have specific marks. Its neurosthenic tonic virtue is less effective against the putrid or typhoid fevers; it is perhaps not without some effect in purulent fevers, unless the patients are under too deleterious personal conditions, endemic or epidemic. Considering the mortality in the grave puerperal fevers of our lying-in hospitals, we have often said that if we had a charge in them, we should not hesitate to give the preparations of cinchona and the sulphate of quinia to the women who are at the hospital awaiting confinement; and that, after this, we would continue the use of the same remedy for some time, and before the presumed date of the attack. It seemed to us that this preventive treatment might have power to lessen the effects of infection, and to render puerperal purulent fevers less severe. A physician of Eu, Dr. Leconte, seems to have used sulphate of quinia with success, not as a prophylactic, but as a cure, in a certain number of these fevers when once evident. The remittency of the symptoms, their pernicious form, the evidence of a general morbid state, of a true grave fever *sui generis* and the secondary character of the local phlegmasia, the metroperitonitis, are the arguments used by Leconte in favor of sulphate of quinia. The facts which he cites seem to us encouraging, especially when

they encounter in puerperal fevers the fundamental traits which suggested to Leconte the idea of using cinchona (*Union médicale*, février, 1851).

When the neurosthenic tonics are given in continued malignant affections which really require the use of them, the radical forces are sometimes in such a state of resolution that the action of the drugs is not immediately stimulating enough to be felt and to assist their absorption. The system has fallen so low, its incitability is so exhausted, that a tonic can no more excite it than it could an inert body. The case is often so pressing that it is to be feared lest life become extinct before the cinchona has had a chance to act. We must then give a diffusible agent like wine, ether, etc., to raise the forces to such a pitch that they will respond to the slower action of a tonic, as a musical string must be stretched to a certain extent in order to vibrate under the bow. If we can excite a little fever by these diffusibles, the imminence of death is banished, for the fever does not kill.

The opinion that the mode of action of cinchona and its antiperiodic effects consist in a local revulsion which destroys the morbid irritation, in virtue of the principle "Duobus doloribus simul obortis," etc., is too discredited to deserve reputation. It is enough to show its insignificance, if we remark that an intermittent is very easily cured by introducing cinchona directly into the secundæ viæ, as is practised in the endemic method, which has such power in pernicious fevers, where the administration by the primæ viæ is impossible. Have we not said that by occasionally taking cinchona one might fortify himself against the endemic intermittents of a country? In this case, does the habitual revulsion maintained by this tonic prevent an affection from becoming established? If it is so, let purges be taken, let blisters be used, and if in this way fever is averted as cinchona does it, we will declare the theory true.

There appeared in 1855 a very important monograph upon cinchona, from which we have borrowed precious fragments for our article on this great remedy. This is the learned "Traité du quinquina," of our honorable colleague Dr. Briquet, physician at the hospital of La Charité. For the special facts with which this obstinate and severe observer has enriched the therapeutical history of cinchona, we refer to our special article. We have only to concern ourselves with the general theory offered by Briquet regarding the mode of action of sulphate of quinia in intermittent fevers and periodic affections.

M. Briquet is the first physician among us who gave sulphate of quinia in large doses in grave fevers and acute articular rheumatism. In these experiences he observed the stupefying action of this remedy upon the brain and the senses, and the sedative or hyposthenizing effect it also produces upon the heart and the animal heat. Struck with these effects, which some old observers noticed after large doses of Peruvian bark, but which modern physicians had lost from sight, he attempted to deduce therefrom the theory of the curative action of sulphate of quinia in fevers with accesses, and all the intermittent affections. He says that it pre-

vented attacks of fever, by stupefying the portion of the nervous system which, in forming an attack, enters into unusual activity.

This theory is specious; but it is doubtful if it can resist a more profound observation of the nature of intermittent fevers and the general properties of cinchona.

Its first defect is that it considers an act of paludal intermittent as a mere physiological superexcitation of the nervous system. Far from being the sign of a real and radical exaltation of the forces of life and the nervous centres, an access of intermittent fever presupposes a primary debilitation of these forces, and soon a special morbid irritation of the nervous system which manifests itself by symptoms of abrupt concentration and violent reaction of calorification and circulation. This surprise and perturbation of the functions most intimately connected with the general forces of life always indicate an impression of profound weakness made upon those radical forces of the system which are everywhere present and feed and sustain incessantly the special activities of all the apparatus.

In paludal impregnation this impression of radical debility is particularly marked. It exists in a latent way before the invasion of the first febrile access, and persists, becoming deeper and deeper in the following attacks. It brings on in time the cachexia which is observed in the inhabitants of marshy countries who have not had febrile attacks, as we see saturnine cachexia in workmen who have never had a special lead disease. Nothing is more debilitating to the vital principle than the miasm of the marshes. Hoffmann, Cullen, Brown, all the neurologists, have seen this clearly. That the symptoms and accidents, periodic or otherwise, which arise under this primitive impression of weakness, are characterized by an active superexcitation of certain apparatus, proves by no means that the nature of the disease, or the primary disposition produced in the system by the miasmatic impregnation, is not essentially asthenic and depressive. In a general way, every disease, however sthenic it may appear, carries with it a principle of weakness. The greatest morbid exaltation is never anything but irritation, that is the superexcitation or excess of action in a being deeply stricken with feebleness. Nothing is more common than this apparent contrast. It is a part of the very essence of the disease.

Diminution of the potential with increase of the actual forces, as Barthez says; or, with Hunter, diminution of force, increase of action, that is the character of malignant disease, especially of such as is subject to cinchona. But in this respect there are only differences of more or less between all diseases. The term sthenic is applied to those in which the forces are enfeebled, though the action be very vigorous, and asthenic to those in which, in spite of a radical depression of the forces, the actions may nevertheless be violent. The great physician is known by the certainty with which he judges the measure and the proportions of this relation. One of the most remarkable characteristics of grave paludal affections consists in the disproportion, often fatal, between the profound exhaustion of the common vital functions and the excessive or incoherent

excitement in the action of certain special apparatus. We have sufficiently said that the malignity and perniciousness of the acts consist in this. If the characteristic symptoms of an access of pernicious fever with symptoms of violent irritation supervened on an organic base which was not menaced with sudden exhaustion by the impression of an essentially debilitating cause, they would not present any danger by themselves, and cinchona would have nothing to do. This is manifest in the pernicious attacks due to causes less insidiously antivital than the paludal miasma. Such are certain pernicious intermittents, masked or not, connected with a gouty state of the system.

In many cases, the symptoms of the pernicious attack are proportionate to the profound vital debility. This is observed in syncopal, algid, choleric fevers, etc. In this case it is less easy to be deceived, and the indication for stimulants presents itself. The diseases marked by oppression of the forces present in the opposite direction a remarkable disproportion between force and action, the latter being weak and fettered, while the former retains a great power. This also is an inverse therapeutic problem.

If these distinctions are well grasped—and the antiperiodic properties of cinchona as understood by us seem of a nature to demonstrate their reality still more—we can see that the theory of Briquet is more specious than solid.

First, the estimable author of the "Traité du quinquina" always confounds tonics with excitants. When he refuses to cinchona the tonic action in the treatment of fevers of access, we see that he really wishes to deny it the excitant action. We have sufficiently stated what distinguishes these two properties. The stimulant property is just the contrary of the tonic property. The one, according to Hunter's language, increases force and moderates action; the other increases action and exhausts force. The dose of cinchona or sulphate of quinia required for checking an intermittent fever does not necessarily produce any appreciable stimulation nor stupor. Does it then produce no physiological effect? Certainly it does, but they are latent. This signifies only one thing; that the primary action of cinchona is exerted upon latent functions. Of these functions there are not more classes than one. The only ones, the only latent sense of the system, are the elementary vital functions, that is the vital sense, which exist even in the germ without manifesting action otherwise than by maintaining the vital state, vital resistance, the aptitude for organic and functional development of the living being which is there concentrated in a certain way. This latent vital sense does not abandon the developed organism. It is this sense that, in the adult, forms the *point d'appui* for all special activities. Upon it, primarily, falls the debilitating effect of the paludal miasm, which reigns latent before the first access and between the later accesses. Upon it, also primarily, falls the tonic action of cinchona, which latently establishes itself, between the attacks, and prevents the special functions from yielding, as the latent debility produced by the miasma disposed them to do.

If the physician is forced to use doses of cinchona which are capable of stupefying the nervous centres and the circulation, for rebellious or pernicious attacks, he certainly does not increase the dose for this latter purpose, but certainly in order to produce a deeper tonic impression upon the vital functions. It might even be desirable that this stupefaction of the outer senses should not occur. When it is desired to appease the fever and the pains of acute articular rheumatism, or of a neuralgia, we understand that narcotic doses are used; cinchona is given during the fever and the pains, and it is obliged to be pushed to narcotism. But if it is by this property that it acts against an access of intermittent fever, why not give it during the access and in a stupefying dose? Why give it the night before? The fever is, in this case, of a very different intensity from what it is in acute rheumatism. Here it is not appeased while existing, but it is foreseen while absent, without having produced the least appreciable sedation of the nervous centres and of circulation.

People avoid fevers in countries full of miasmatic pools by taking good wine, tea, coffee, abundant nourishment, with or without cinchona, while other unhappy beings, who have not the same hygienic tone, have the fever for a part of the year, and fall into a semiscorbutic cachexia and cold engorgements of the abdominal viscera. Do the former prepare themselves by hyposthenizing their nervous system, or do the latter succumb to fever through stimulating the system to excess with cold damp air and water. We must remark in passing that the paludal diseases call for hygienic fortifiers of all kinds; and that the patients, if not prevented by personal irritations, bear it very well, even better than in health. The best auxiliary to the treatment of fevers by cinchona is a generous and comforting diet. This hygiene, recommended and followed vigorously by Boudin, is one of the capital conditions of his success with arsenic.

Certainly cinchona loses much of its effect in paludal cachexia with or without persistence of febrile attacks. Still, we have seen it succeed in these cases better than any other remedy. Does it act as an hyposthenisant in curing these feverless, pale, anæmic, infiltrated, splenitic subjects? And when sulphate of quinia prevents an attack of fever, algid, or syncopal, or choleric, is this action effected by weakening the circulation and the heat?

We said in beginning this discussion that Briquet had been deceived by the novelty of the effects of the sulphate of quinia in large doses in rheumatic and typhoid fevers. Here the stupefacient action is palpable, because it is exercised upon the most evident functions of the economy. But if the therapeutic effects are evident, the physiological are also, or those upon the healthy man, which are the medium. It is not so in intermittent fevers. Here there are no evident physiological effects; and yet, therapeutic effects of incomparable certainty. How can it be the same medium acting in both cases?

Before producing stupefiant effects upon the nervous centres, sulphate

of quinia produces latent tonic effects in the vital functions, which the former would not destroy unless they were carried to the point of fettering the activity of the organic functions, indispensable, in virtue of the *circulus vitæ*, to the support of the common vital functions which reciprocally form the basis of their operations. Far from being the case that quinia prevents the access of intermittent fever by its stupefying effect on the nervous centres, the effect rather occurs in spite of this action. At least, it is useless. If one is obliged to permit it sometimes, it is never necessary.

The analogies taken from the antiperiodic efficacy of opium, digitalis, arsenic, etc., prove much less than is supposed. There is no modifier of the system, of any sort, that has not had successes. And opium is not without a tonic property, though this is not predominant, as in cinchona. "Opium me hercle non sedat" said Brown. In the eyes of some observors digitalis justly seems a fixator and a tonic to the movements of the heart. It evidently has other properties, as cinchona possesses, besides or above its tonic properties, those of a stupefiant to the brain and heart. Who denies it? But these latter properties are preceded and sustained in some sort by fundamental properties which are essentially tonic. The reader knows the sense in which we use the word. Tonic is not stimulant, but on the contrary fixative and moderative of the vital activity. It produces that sort of moderation of which the condition is stability, fixed energy, the state of equilibrium, as Briquet himself expresses it, that is to say, profound force. That is why it acts at the base, in a manner wholly latent at first, and which is only perceived by the ulterior results.

To the list of sedatives which cut off the access of intermittent fever we might oppose a group much more imposing of bitters, tonics, compound remedies like theriaca, which since the time of Æsculapius have been universally consecrated to the treatment of intermittent fevers. The last remedy composed of diffusible stimulants, fixed stimulants, tonics and calmants, is that which best represents the manifold virtues of Peruvian bark. The bark is a sort of natural theriaca, much more marvellous than Nero's medicine. After all, the best substitutes for cinchona are the bitters, such as gentian, centaury, Winter's bark, rhubarb, angustura, camomile, green coffee, salicin, ilicin, etc.

What shall we say of the support which Briquet finds for his theory in the antiperiodic virtues of arsenic?

We will reply that arsenic has no hyposthenisant effect upon the persons to whom, and in the doses in which it is given to cut short a fever. If we can believe the accounts of arsenic-eating, this substance impresses tone upon all the organic functions, and especially maintains the circulation and the respiratory action at an extraordinary degree of energy and resistance. Beyond doubt, arsenic, in excessive doses, causes a sort of artificial cholera which proves deleterious and profoundly hyposthenic effects. But the same is true of iodine, ammonia, phosphorus, sublimate, camphor, and all the acrid and violent poisons which overexcite and irritate

at first, and afterward suspend and congeal all the manifestations of life.

The error into which we think the honorable and laborious physician of La Charité has fallen in no way lessens the merit of his work for our eyes, nor the value of the ineffaceable pages he has added to the history of the drug which disputes with opium the first rank in the materia medica.

In concluding this chapter, it remains to speak of tonics as general stomachics and fortifiants in the treatment of a different class of affections from those we have hitherto studied.

This treatment was formerly in much greater honor than now, especially in chronic diseases, at the end and during the convalescence from acute diseases, and finally, in the whole course of certain sorts of these diseases.

It is right to say that if the physiological doctrine has been too exclusive in its proscription of the use of tonics in general, it has rendered a signal service in its successful attack upon the former abuse of these drugs.

Unintelligent pupils have often let accusations come upon their illustrious chief, from which his writings ought to clear him.

Nothing more sage and just could be said than the indications which Broussais laid down for stomachics, in the therapeutic propositions of his "Examen des doctrines." We shall think ourselves happy if in reproducing these principles instead of expressing them in our own words we may avenge the great physician of the errors which have been committed and professed in his name.

"The indication for soliciting the stomach by tonics is not drawn from weakness nor from emaciation, but rather from pallor and largeness of the tongue, and a sensation of languor and slowness in digestion when unstimulating food is used. It may also arise from pains of the stomach, eructations, the borborygmi and colics which accompany this kind of digestion, when these accidents do not appear after eating more irritating food" (Prop. 445).

"General debility without phlegmasia requires only good food and a moderate dose of wine, if digestion is good. If it is difficult, the bitters are necessary" (Prop. 446).

"When the most violent gastro-enteritis is prolonged to a certain point, the debility furnishes indications which must be filled by alimentary substances to prevent death *per inediam;* for there comes an epoch when digestion is impossible, in spite of the persistence of inflammation, without exasperating the latter" (Prop. 441).

The cases indicated in these excellent propositions are far from being the only ones in which bitter tonics may and ought to be used as stomachics; and we should make it a duty to note all the morbid states which require it, but that we have to speak of them under the aromatic umbelliferæ and the labiatæ (Chapter XII.). All these developments will be found there; they apply very well to the bitters.

The tonics are further useful as general fortifiers in a multitude of acute or chronic diseases in which it is necessary to support the strength.

In the "Examen des doctrines" there are found other propositions by Broussais, in which some of these indications are well formulated.

"The dropsies which originate from bad assimilation disappear under tonics, dry, warm, and luminous air, good food, and the remedies for scorbutus (if the latter exists)" (Prop. 395).

"The dropsies which are due to famine, to hæmorrhages, and to other causes of exhaustion, are cured by tonics, good food, wine, alcohol, and the active diuretics, when there is no disorganization in the viscera; but we must be very careful to graduate the restoration" (Prop. 396).

"Whatever may be the debility which accompanies the irritations (we restrict the word to signify any degree of acute or chronic inflammation; for if it is allowed to have the vicious latitude which it has in the language of Broussais, we should be far from sanctioning this proposition), they alone furnish the indications, provided they are sufficiently violent to be made worse by the ingestion of food and stimulant medicines. As soon as the contrary takes place, debility furnishes indications which combine with those which depend on irritation; finally, when the latter has ceased, debility becomes the chief disease, but the irritability of the organs requires great management in the use of stimulants" (Prop. 428).

"Convulsions and pain, under whatever name, are followed by a debility which sometimes furnishes the only indications" (Prop. 429).

"Parturition is sometimes followed by a debility which progressively increases until death, and which alone furnishes the indications, though it be a product of irritation" (Prop. 436).

"Debility with phlegmasia, situated elsewhere than in the alimentary canal, requires light food which leaves little residue, if the phlegmasia is acute, but it proscribes stimulants, the irritation from which would be repeated in the inflamed organ; if the phlegmasia is chronic, this debility requires substantial, but easily digested food. The tonics are required only in small doses and temporarily" (Prop. 447).

"The debility with a catarrh which exhausts by excessive expectoration, without fever, demands substantial and digestible food, with very moderate doses of astringent tonics. Such are cinchona, lichen, and acetate of lead" (Prop. 448).

"Debility with acute colitis requires only the treatment necessary for this disease; but in chronic cases it necessitates feculent food deprived of all that can leave a residuum in the colon, and the moderate use of red wine, to keep food on the stomach, for the irritation of the colon calls them toward that intestine before they are assimilated, and they there act as purgatives" (Prop. 450).

"Debility produced by excessive hæmorrhages requires gelatinous, albuminous, and feculent food, with a little red wine, some astringents and fixed tonics; but it rejects food of high flavor. The diffusible stimulants are only suitable directly after great hæmorrhages" (Prop. 441).

The success of tonic treatment, and especially of that which we are now studying, depends much on hygienic conditions and the moral state of the patient. Life in large cities, as Paris, generally develops a diathesis of irritability in persons who nevertheless have much need of tonics. This contraindiction is very embarrassing to the physician. As long as these persons live in the place where they contracted their erethism, tonics change into irritants and are not tolerated. If they leave Paris, and the nervous excitement which by degrees engenders atony mixed with irritation, cinchona, bitters, wine, analeptic diet, are admirably borne, and fortify instead of irritating. A simple change of residence is often enough to deprive the tonics of their value. Calm and force are regenerated in the system by the simple fact of rustication. Life in great cities enervates to such a degree that nourishment ought to be more restorative and generous than in the country.

The inhabitant of Paris who lives in the current of affairs requires much more wine and meat than the countryman, and the frugal regimen which sustains the latter would let the nervous system of the former break down. These remarks should be taken into consideration by practitioners in great cities. Those of the country may draw the opposite conclusion, that tonics, though less frequently indicated in their patients, are also much better borne. Among peasants, the chief opportunity for using tonics is found in diseases properly so called, especially in acute disease. The health of the citizen demands those remedies more specially in the ordinary course of life, in the habitual indisposition of debilitated persons, and in chronic maladies. The life of great cities is of itself the best tonic in the chronic diseases arising from debility, in inhabitants of the country. Living in the country is, in the same cases, the best tonic for the city man. This inverse relation is explained by a salutory excitation of the nervous system in the former case, and in the second, by a rest of that system, combined with a beneficent restoration of the vegetative force of the system.

The entero-mesenteric fevers sometimes take a form which is called adynamic, in which the use of tonics is perfectly indicated. But in order to derive benefit from it, the true nature of the adynamia must be recognized.

It is indispensable, under penalty of the most dangerous errors, to understand well the value of the word "adynamia" as applied to entero-mesenteric fevers.

One of the essential marks of these fevers is a considerable primary prostration of the animal functions, and especially the voluntary muscular power. This prostration is common to all forms of the disease; it is one of its most constant generic characteristics. But, though thus limited to the apparatus of animal life, it is far from sufficing to constitute the adynamic variety of grave fevers, and furnishing the indication for tonic treatment: for this indication must be found in the *enfeeblement of the organic functions which are most immediately necessary for the maintenance of*

life. As long as prostration strikes only the external functions, it may be, and almost always is, connected with a general vital reaction, that is, a very energetic fever, and ought not to suggest the thought of active treatment. This primary collapse of the functions of the life of relation deceived many of the older physicians and led them to consider it as the expression of a radical enfeeblement of the vital forces, so that they lavished stimulants and tonics at the first, with the purpose of provoking or sustaining a salutory reaction, the energy of which they measured by that of the cerebro-spinal nervous system. The qualification of Pinel (although in the mind of this nosologist it represented a very just and distinct idea of the false adynamia which we have mentioned) deserves the reproach of having sustained the error in question; for usage has almost entirely restricted it to mean the loss of muscular force solely.

What is requisite to constitute the adynamic form of grave fevers, and to justify their treatment by tonics?

It is requisite that the prostration of the *vital forces* should be added to that of the locomotor functions. It is especially necessary that the febrile action be suspended or considerably lowered beneath the degree which is strictly necessary for the full and regular accomplishment of this long series of pathological operations which in their totality are called typhoid fever.

The illustrious author of the "Nosographie philosophique" was also very wrong in confounding adynamia with putridity, two forms of grave fever which, though often associated, are nevertheless distinct. The second of these states is characterized in a general way by an extreme disposition of the solids, and especially of the fluids, to assume a crasis which is compared, with more picturesque than scientific truth, to that which is imagined in living tissues which tend to escape from the affinities of vital chemistry and to obey those of inanimate chemistry. The idea of putridity in these diseases has been made up of the coexistence gratuitously supposed to exist between these two contrary states. Galen had this view. "Atque hæc putredo non simpliciter putredo consetur, sed etiam habet aliquid concoctionis; manente enim adhuc coquendi facultate vasorum, putrescens tunc humor ad talem alterationem deducitur," etc. He afterward shows how, from the different degrees of dominance of these two opposite states, absolute putrid decomposition and the persistence of a remnant of plastic power in the vessels, there result infinite varieties of putridity, from a slight septic tendency to almost complete dissolution.

The putridity in typhoid fevers is compatible with a very high temperature ("omnis febris, quo magis est calida, eo magis est putrida," Boerh.), with active turgescence and injection of the skin and mucous membranes, a great development of the pulse, in a word, with a very ardent fever; and the *causis* of the old school is nothing else, while true adynamia is chiefly recognized by the absence of all these phenomena. To the latter, nevertheless, there is quite often joined a true putrid state,

and then the indication for tonics is not weakened ; while it is necessary to be very careful not to use them when this state is accompanied by the energetic febrile reaction of which we spoke, as is very often the case.

The special and differential notions of adynamia and putridity being now fixed, we may enter upon the clinical subject.

Among the patients admitted in 1835 to Chomel's clinic, affected with adynamic typhoid fever, nearly one-half died. All had powerful tonic treatment ; but in all the cases in which Chomel used it, the patients would very evidently have died without it. This is exactly what makes the importance and the value of these successes, since they can neither be attributed to the forces of nature nor to a remission of the symptoms which could be foreseen. We shall presently see how much doubt the absence of this condition throws upon the efficacy of several other modes of treatment, and bleeding in particular.

We have observed only six of the patients admitted this year to the clinic with the adynamic form and treated with tonics ; but we found in them the following state : Heat of the skin less than normal ; state of the tongue and the buccal mucous membrane analogous, these parts being covered with normal or dried secretions ; air expired cool, pulse slow and feeble (50—65), or rapid and weak, but in the latter case much more feeble and empty than in the former ; contractions of the heart in direct ratio to the state of the pulse ; involuntary diarrhœa, meteorism more or less considerable, painlessness of abdomen under pressure ; retention of urine, or involuntary discharge ; crude, thin, whitish or natural ; typhoid spots ; eschars or erythematous redness of the skin at points exposed to pressure. Muscular weakness so great that the patients could neither turn nor bend themselves in the bed, and had to be sustained and propped up in order to prevent their falling back continually into the same position. We saw one, in particular, who without this foreign help would have remained a whole day in the same position, however painful.

The weakening of the moral and intellectual faculties is sufficiently betrayed by this profound prostration of locomotor power; the senses and the intellect shared in the languor and impotence of motion.

Nothing less than this complete adynamic group gives to Chomel the warrant for aiding a system which is so near to giving up all reaction. The absence of even one of these elements of adynamia sometimes makes him fear to compromise such a heroic medication; absence of the heat of the skin, for example, or the redness of the tongue, or the development of the pulse, if absent, even when all the other symptoms of adynamia are present in the highest degree, have often formed express contraindications for him, which perfectly supports the essential condition which we were just now exacting for adynamia as an indication for tonics, to wit, defect of febrile reaction, radical enfeeblement of the most primary and necessary functions. But let these conditions be united, and then the professor no longer hesitates; he bends all his forces (to use his own expression) "to

give the patients back their fever;" a Hippocratic principle of immense fecundity.

Chomel employs generous wines, and cinchona in various forms, as the basis of treatment; ether and camphor are sometimes added. Sage, serpentaria, cascarilla, may replace cinchona. Malaga wine is given rather than the other wines of Spain or France, by the spoonful every two hours, every hour, or even oftener; from 4 ounces a day to 8, or even a quarter of a bottle. Less alcoholic wines, such as those of Bordeaux and Burgundy, are mixed with the ordinary drink in variable proportions and form the ptisan. Seltzer water with wine, for example, is often thus ordered.

Cinchona is given in the form of extract in the dose of a few drachms, and up to one or two ounces in a draught; for a drink, one or two pots of an aqueous maceration of cinchona sweetened with lemon syrup or tartaric acid syrup; in enema, camphorated decoction of cinchona; finally, fomentations of wine and alcohol, or with camphorated oil of camomile, to the abdomen. This treatment is renewed every twenty-four hours, and is not suspended until the skin is again warm, the pulse more resistant and febrile, the senses, the locomotor apparatus and the intellect more excitable, awakened from their stupor and lethargy. We have seen five patients who owed a genuine resurrection to this treatment.

But the intestinal ulcerations, and the vast eschars of the sacrum and the elbows which you dress daily with powdered bark, the animate digestive, styrax, and foment with alcohol and sage wine? Well! do the eschars do so badly with those incendiary tonics? Do not argue the illegitimacy of the analogy, for we can show you intestinal ulcers cicatrized, or nearly so, in persons who died after the most vigorous and sustained tonic treatment.

It has been said that gastro-enteritis (typhoid fever) is less adynamic of itself than it is made so by the tonic treatment; for since they have been treated like simple phlegmasias by a good antiphlogistic treatment, they no longer become complicated toward their close with that grave group of symptoms for which Pinel created the word adynamia.

Hippocrates first used the word "typhus" or "fibris typhodes," because, being reduced to simple and immediate observation, he denominated diseases by their most apparent phenomena, especially those which are most fit to lead to the therapeutic indication. Thus, he called febris typhodes not all entero-mesenteric fevers (for not all are accompanied by a typhoid state such as dominates the others; it sometimes does not exist at all, and for that reason, this expression, used generally, is false, and may lead to an error in diagnosis), but those among them which struck him first by the profound stupor which marked them, "affectus ex phrenitide et lethargo mixtus." Though it is he that describes them, we cannot mistake our adynamics: "Typhus invadit æstatis tempore, quam Canis sidus oritur, bile per corpus agitata. Statim igitur febris vehementes cum corripiunt, et gravis ardor, et cum gravitate imbecillitas, crurumque et manuum impotentia quæ nullum ei usum præstant. Venter perturba-

tur, et quæ evomuntur graveolent; vehementia termina accedunt; rectus stare nequit, neque oculis suspicere," etc. And if this suffice not, he has his observations. Several patients, including the Clazomenian, in the first book of the "Epidemics," testify that Hippocrates painted from nature.

Galen, in his treatise "De methodo medendi," lib. XII.) gives the description of a mesenteric pituitous fever which is certainly a typhoid fever with the mucous and adynamic form. The pulse was less frequent than in health, even when the disease had reached the period of culmination. Bleeding was already well understood in its use and abuse. Hippocrates, after describing his *typhus*, says: "Ei celeriter eadem remedia quæ morbo laterali exhibenda;" that is, the remedies which were used for pleurisy—and he bled in pleurisy. Then he adds, with a candor unknown to the systematics: "At pauci evadunt!"—few recover. Does not Celsus blame the blind fashion of drawing blood in all cases? "Sanguinem secta vena mitti, novum non est, sed nullum pene esse morbum in quo non mittatur, novum est." Baillou, whose Hippocratic severity would be beyond reproach if he had not had a weakness for bleeding which has not been surpassed in our days—Baillou, because experience had so taught him, turned aside with his bleedings from that *quid divinum* (as he calls it) of pestilential fevers; in these affections he confesses: "sæpissime detrahitur laudabilis sanguis magno ægrorum et virum detrimento. An venæ sectio tunc utilis? nequaquam; aut parce detrahatur, imo alexipharmaca et cardiaca dentur." The physicians whose objections we are trying to overthrow will doubtless not refuse the testimony of De Haën, that fiery apologist of bleeding, whose bitter and passionate pages too often lose the Hippocratic moderation and calm. In malignant fevers he had been forced to abandon his cherished practice for cinchona, in favor of which he reports conclusive facts. Bosquillon, who bled without exception of age, sex, disease, or temperament, withheld here his eternal and mechanical "mittatur," and confessed that in this case "the authority of authors could do nothing against facts;" with Cullen, he advised tonics.

The study of the course and the natural and happy solution of the typhoid affection proves that the assemblage of a certain order of febrile phenomena, the form, degree, harmony, duration, and modes of termination of which are known by observation, at least in their general points, proves (say we) that this assemblage phenomena ought to be inevitably developed, and that a great danger begins from the moment when they slacken, are suspended, or perverted. The system incurs danger from the want of reaction, the indication is frank; it is necessary that the man of the art, "naturæ minister et interpres," should renew in his patient the fever which has abandoned him, and happily there are means for so doing in the treatment which Chomel so skilfully managed: "Namque hoc tempore (says Sydenham) quo magis calefecerim, eo magis concoctionem acceleravero." Yes; for we ought to measure the degree of febrile reaction and vital resistance by the degree of organic heat, as this is the fundamental phenomenon to be considered in judging of adynamia and its de-

gree. Chomel cites the case of a young girl affected with typhoid fever, who remained four days "cold and pulseless," by excitants and tonics she was brought back to life "through heat and pulse;" and soon recovered. Quarin relates that in 1772 Storck snatched him from death by means of cinchona and Virginia serpentaria. "My condition was so grave," says he, "that the whole city (Vienna), by a wholly gratuitous kindness, for which to my death day I shall always be deeply grateful, paid the tribute of regret for my death."

Another very important sign, which often coincides with the fall of the fever and true adynamia, is the crudity of the urine. As Sydenham and Huxham so well show, they are almost limpid and natural, "crudæ, sine sidemento, instar cerevisiæ albæ." The urine of fever, especially toward the close, should have the opposite character. We may recall the fever patient of Hippocrates, who died with natural urine and pulse: "Urina bona, pulsus bonus, æger moritur!"

Shall we make nothing of the instinct of patients, who seek and demand fortifying drinks, wine, etc.? "Æger cupit roborantia et vinum," says Sauvages; "noctu symptomata ingravescunt" (another sign of adynamia. We have heard the patients call for their wine; we have seen them drink it with avidity; we recollect in particular a student of medicine, with the most terrible adynamic form; three attacks of eclampsia had occurred, and we know how dangerous this complication is. Besides the extract of cinchona, the patient took daily 8 to 10 ounces of Malaga wine. One day he swallowed at once the whole quantity that was to have been distributed over twenty-four hours. The following night he slept better, and recovered rapidly.

The indication for tonics is nowhere more frequent and imperious than in the diseases of old men. We do not think that the phlegmasiæ of old men should be treated without antiphlogistics and always with tonics, but we believe it useful to combine these two sorts of treatment. There is a very good paper by Dr. Guislain, in the *Gazette médicale* for April 5, 1836, on the treatment of mental diseases by tonics.

Tonics are excellent in scrofulous affections; we may even say that analeptics, gymnastic tonics, sea-baths, small quantities of bitters at intervals, will remain the most powerful and perhaps the only really curative remedies for scrofula.

Tonics used to be much employed as alexipharmics, *i.e.*, expellers of poisons, depurators. It is certainly often of use to aid the system with fortifying agents to resist the causes which attack it, but it is hard to understand clearly this sort of indications. Some old physicians incorrectly believed in a neutralizing action on the part of alexipharmics; the tonics and stimulants then act only by giving to the system force to digest and eliminate the morbid products. Yet it is not impossible that the old opinion upon this point needs only to be modified, and not absolutely proscribed. There is truth in what they said of the direct antiseptic action, independent of all primary neurosthenic influence.

"Medicine," says Broussais ("Examen des doctr. méd.," t. IV. p. 561), "is not a chimical manipulation; the reagents have some action upon foreign substances, when they are only in the digestive tract, though we should not forget the vitality of their parietes; but in the secundæ viæ, in the ways of absorption, circulation, secretion, and in the framework where nutrition goes on, the eye of the chemist sees nothing, the hand of the manipulator directs nothing; other data than those drawn from brute chemistry must be followed; these are the vital laws, constituting the interior providence of the organ, which produce the transformations, the departures, the eliminations, the depurations, and usually it is only necessary to moderate or reanimate the excitation suitably, in order to enable them to succeed in their function."

In gangrenous affections, the system is aided by tonics to eliminate a portion of the gangrenous member, by the same mechanism, or perhaps by an analogous mechanism.

Therapeutics formerly possessed in these cases a very much lauded remedy, now entirely discredited—theriaca. Sydenham had a high appreciation of this monstrous electuary, which aided the old physicians in an infinity of cases. He used it in nervous diseases. He says: "Theriaca Andromaca vel sola, si crebro diuque usurpetur, magnum est in hoc malo (hysteria) remedium. Neque vero in hoc solo, sed in aliis quam plurimis a caloris et concoctionis sive digestionis defectu ortis, omnium forti potentissimum quæ hactenus nobis innotuere, ut a plerisque fastidiatur, quod et pervulgata sit et a tot sæculis jam cognita."

As this is the place for speaking of this compound, and as our personal experience is not such as to enable us to speak of its value, we will in conclusion quote a remarkable fragment from Bordeu in his researches into the history of medicine ("Œuvres de Bordeu," t. II., p. 564).

"Andromachus, physician to Nero, made an enormous assemblage of all sorts of drugs. It is not known what genius led him to it. It was not method, for he knew that well enough to feel the absurdity of his mixture; but he did not know it well enough to prevent his undertaking; he combined all the empirics' formulæ, and made a monstrous compound which still subsists, and always will, which will always wreck all arguments, all systems, and never will be banished; it is, so to speak, according to the heart, the instinct, or the taste of all men.

"It seems to me that theriaca, which is essentially like a spirituous liquor, and can only be perfectly replaced by wine and its preparations, contains eminently all the virtues needed in the distresses, and in many of the symptoms of disease; it consoles nature; it restores it in all cases of languor, feebleness, sadness; it arouses the functions of the stomach, which are always at fault in these disorders; it excites in the body a tumult of intoxication, necessary in order to subdue the derangements of this important organ, which is in so many respects the centre of life, of health, and of the exercise of all the functions. It succeeds in a thousand cases which seem opposite, because it has a thousand aspects

favorable to health; it unites, so to speak, all possible tastes of all stomachs.

"I am sorry for theory, and for physicians of all other sects than that of the empirics. They may attack it as much as they please; they may prove that this composition is contrary to common sense, by the rules of good pharmacy; but the speech of all the ages is stronger than the finest dissertations. Andromachus made a *chef-d'œuvre* which was necessary to the human race, and equally useful to animals.

"That physician would be laughed to scorn among us, if he tried to answer all the theoretical objections which might be made to the composition; he would not be received as a bachelor in the schools; but his remedy is in vogue everywhere. For several years I saw a bolus of theriaca given every evening to all the patients at the hospital at Montpellier, while the schools of this metropolis of medicine rang with invectives against the composition.

"I have seen theriaca given in a very large dose for all troubles, in all families, by all the experienced old women, and I have seen it succeed many times when I should not have known what course to take in following the indications drawn from theoretical principles. What a vogue has been attained, in our modern Paris, by formulæ which were only theriaca in miniature, or more or less active cordials! How many efforts have been made to imitate these formulæ by those who decried them!

"I know a physician who professes to prove that more use has been made of warm drugs in Paris within the past ten years than had been used in the previous thirty; this use has been made by the very men who decried those who restored to use the warm remedies of our grandfathers, that is, theriaca, wine, and resins dissolved in it.

"All the voluminous praises of pure water, the great number of cures attributed to it, the excessive use made of it, have failed to turn the instinct of men ill and ailing from their inclination for cordials and the active drugs which reanimate life and help in bearing its burden. If the patients have become accustomed to fear heating remedies and to run after cooling things; if the history of the circulation and the scholasticisms of inflammation have made us acquainted with fire and gangrene, and the engorgements, and suppuration, and the small vessels, it must be admitted that these fears arise from prejudice alone. There is usually need of remedies which help to live, which give force, which arouse the passions required in the various conditions of man's life.

"It is for medicine to find such remedies. The water which cools, the diet which enfeebles, are in the hands of everybody. Theriaca and its imitations, wine and its combinations, awake activity and sustain life instead of enfeebling it. Nevertheless it is true that there are some occasions when the true cordials are watery or relaxing remedies. Such, for example, are the acute diseases."

CHAPTER XII.

EXCITANTS.

Anise.

The reputation of anise and all the analogous plants is not unsupported by antiquity and unanimity of testimony. From the impression made on the senses by the umbelliferous plants, and all those which have marked aromatic properties, it was an easy step to infer their natural and immediate medical application. Before Hippocrates drinks, and especially fortifying epithems, were made with several parts of the vegetables which we are studying. In speaking of anise in particular, Hippocrates specifies further, and attributes to the plant virtues which are far from being generally admitted in our time: those of emmenagogues and diuretics. "Anisum vino maceratum bibendum propinato ad uterum expurgandum." Elsewhere, in speaking of the diseases of women, he says: "Confert anisum et quæ urinam movent."

Galen assigns to anise one other quality, that which is the most unquestionable of all, and which will embrace most of what we have to say of the umbelliferæ—we mean their stomachic and carminative virtues. "Anisi semen acre est, subamarum, urinam ciet, digerit et flatus reprimit." Dioscorides confirms these views: "Anis is hot and dry; it causes urination, resolves ventosity, brings milk and provokes to luxury," etc. Need we cite Ætius? "Est enim (semen anisi) in tertio ordine calefacientium et siccantium; ob id et urinam ciet, et discussorium est, et inflationes circa ventrem sedat." Oribasius, Avicenna, etc., bear the same witness. It is needless to add that from first to last the same effects have been noticed everywhere, and by everybody.

We must now try to mark out clearly the special nature and the differential characteristics of the morbid states which require this class of excitant remedies.

These morbid states consist mostly of indispositions, ill-defined lesions of the sensibility of the digestive canal, symptoms which cannot be circumscribed, and which trouble the digestive functions in a thousand ways. Atony, spasm, pain, flatulence, dyspeptic symptoms, vices of secretion, primary or consecutive to previous symptoms, combine in various ways and form the principal elements. The numerous family of the *colics* holds the chief place. Let us well understand what is meant by this word, and not apply it to all pains, of all sorts and nature, originating in the abdominal organs, especially the digestive canal.

If it is true that all intestinal pains, and dyspepsias, are constantly the effect of an acute or chronic irritation of some portion of the mucous membrane of the digestive tube, no doubt the use of special excitants and carminatives ought to be banished from therapeutics, or at least restricted to a very few exceptional cases; but observation shows that abdominal pains are never more intense than in the absence of all inflammation of the gastro-intestinal membrane, and that any considerable symptoms of pain or other alteration of sensibility are referable to complications, to some accessory pathological element; and hence, it must be admitted, that the means of relieving or curing such troubles must be sought in another class of agents than the antiphlogistics and emollients.

The most universal and ancient experience, daily custom, the most vulgar domestic practice, have sanctioned the hot and aromatic remedies in these cases, the light stimulants of the sanguine system which possess at the same time nervine and antispasmodic effects. The investigation of the predisposing conditions and the occasional causes, the knowledge of the nosological character of these abdominal maladies, confirm in this respect the data of empiricism, as we shall show; and this demands a few words of explanation upon *dyspepsia* and *colics*.

To simplify science at the expense of observation and truth is a bad service to render; but this is what is done when it is claimed that dyspepsia is only a symptom, and should never be attacked directly.

If a patient has fever, an acute or chronic affection compromising the play of all the functions, etc., and has no appetite, or if, eating, he digests poorly, slowly, with difficulty, with various local or general troubles, or not at all, he will have in the first case anorexia, in the second an indigestion, and all its results, but this is far from dyspepsia. There are hardly any morbid states, of the digestive tract or otherwise, which do not weaken, deprave, or destroy the appetite, and give rise to indigestion when the rules of diet are violated. The therapeutist never is concerned about such phenomena, which are only symptomatic; dyspepsia is not every lesion of appetite, every inability or difficulty of digestion, from whatever cause, but a very different thing, namely, a primary alteration of the *digestive powers*, which disturbs and checks the accomplishment of the successive changes which the food undergoes before passing to the secundæ viæ, "difficilis et tarda concoctio," according to the expression of Vogel, who first used the word "dyspepsia."

But dyspepsia, thus defined, is very often the manifestation of a general state which governs it, or produces it from a disease which no longer exists but has struck the digestive forces with languor. It would be a gross mistake to assimilate the former of these cases to the symptoms of which we spoke above, which ought not to be the object of any direct treatment; for here, dyspepsia is not an effect necessarily dependent on the general affection from which it springs, but a manifestation of that state; and for this reason it furnishes therapeutic indications.

The gouty diathesis often gives rise to dyspepsia, and without curing

gout we may treat these dyspepsias, bring back the digestive faculties to their normal measure and type; it is true that the result would be less easy and radical than in cases of essential dyspepsia, that is, such as has its sufficient reason for existence in itself, or than in dyspepsias which are relics of disease which have deeply impaired digestive power; but they are still secondary phenomena which it is very important to attenuate and palliate.

There is a considerable number of dyspepsias which demand to be treated by rest of the digestive organs, deprivation of all stimulant ingesta, milk diet, and a skilfully managed return to ordinary diet, etc.; others demain the antispasmodic excitants, of which we are speaking in this chapter. In speaking of certain agents which combine with these properties those of the tonics and bitters, we shall have other forms of dyspepsia to mention. In speaking of the tonics proper, we indicated their use in the treatment of the special dyspepsias, with different causes and conditions. Thus we shall have reviewed the various species of dyspepsia, and the general and special treatment, in a field where we can do much more for relief than we can in some more intense and better-marked affections.

The dyspepsias which are arrested by the aromatic stimulants furnished by the umbelliferæ are those designated as spasmodic or flatulent. The subjects of it are mostly hysterical women, hypochondriacal, melancholic men, men of letters, persons troubled with deep care or simple vexations, who are enfeebled by excessive loss of blood, the abuse of purges and diaphoretics, and excess in venereal pleasures.

Another class is formed by the gouty, the hæmorrhoidal, in whom the flow of blood from the anus, or the appearance of sanguine tumors at that place does not occur as usual; those who abuse tepid drinks, vegetable diet, green vegetables, and especially those dry kinds, which deserve the name of "windy;" and inhabitants of warm climates. In these persons we may observe, almost directly after the repast, odorless discharges of flatus, non-acid, or with only the odor of the food. With this there is often a cardialgia and an inconvenient, sometimes very painful, swelling, piercing or tearing; and colics, swelling of the epigastric region with borborygmi, palpitation, sensation of cold, or weight at the stomach, frequent discharge of limpid urine, etc. The gastric and biliary secretions do not seem changed, and the indisposition consists only in a spasm of the muscular coat of the stomach, especially of the two orifices, and a superabundant exhalation of inodorous gases at the surface of this viscus, to which is probably added that produced by the fermentation of the air contained in the food—three phenomena which unite to attest a weakening with perversion of the nervous forces of the stomach.

The indication for antispasmodic excitants is here express. A mild infusion of anise, angelica, mint, etc., generally relieves the flatus, spasms, and gastrodynia, and makes digestion possible by removing the pathological obstacles. This is a better way to take the umbelliferæ than in the liqueurs made with angelica and that known as anisette. A better substitute for the infusion is to chew aniseed or the stalks of angelica.

The *colics* which indicate the use of the umbelliferæ, as anise and its substitutes, reappear in nearly the same subjects, and in the same conditions, under the influence of the same causes, with the same character and nature as the dyspepsias we have just described. But the use of warm and aromatic remedies is perhaps more general and less restricted, more applicable to the different classes of colic than to the dyspepsias, which bear them badly or are but slightly benefited unless they are of the class which we have defined.

We may say that there is hardly any colic which rejects their use; but they are specific to a certain point in those which all authors who have spoken of colics as a separate disease with independent existence call flatulent and spasmodic. Anise is associated with certain purgatives to neutralize the colics, flatulences, tenesmus which these remedies occasion in many persons; there are useful inferences to be drawn from this fact in treating colics. In some countries anise is mixed with bread; they say that this makes it lighter—that is to say, it is more digestible.

We only indicate these objects, without pointing out what colic is, how it differs from abdominal diseases which cause pain without colic, and what should be the character of an abdominal pain to allow the use of the aromatic stimulants which play so great a part in the treatment of these affections. The umbelliferæ should also be used in infusion in colics. Certain gouty patients, many hypochondriacs, do not digest except when they take after their meal a little anisette. Some of these, and some asthmatics, dissipate flatulency and oppression by smoking aniseed.

We have seen nurses quiet the colics of their infants by themselves drinking infusion of anise, and we have ascertained that the milk of these women has a quite pronounced odor of anise.

The umbelliferæ are rarely used as emmenagogues, though they are able to facilitate menstruation in the cases where we have spoken of castoreum and camphor as specifics. Their diuretic virtue is quite pronounced in chervil, and especially in parsley.

Anise has had a great reputation, as increasing the quantity of milk in nurses. Perhaps it only acts by making their digestion better and more prompt. But it would be hard in this way to account for the property of increasing the secretion of milk attributed to cataplasms and fomentations made with infusion of anise and placed on the breasts. How reconcile these facts with the antilacteal virtue attributed to mint, a plant which has so much therapeutic analogy with that which we are studying?

The expectorant action of anise is weak and very doubtful. It is more successful as a cephalic; that is, as having the power to relieve some headaches, especially in nervous persons, and those which seem to depend on a bad state of the digestive passages. The character of a cephalic gives it value also in vertigoes, confusion, in a word, in all the nervous disturbances of the brain and the senses; for it is to remedies capable of combating these various symptoms that we give the name of cephalics.

Anise and analogous remedies have always been thought antipituitous,

and have been recommended in cold of chronic catarrhs. As a common drink, they are given in catarrhal fevers and mucous fevers, but much more often in that special state of the primæ viæ in which anorexia, dyspepsia, nausea, vomiting, etc., seem dependent on a vicious or exaggerated secretion of the pharyngeal and gastric mucous membrane, which is always loaded with a great quantity of tenacious, very viscous, transparent mucus, hard to detach, and causing (especially in the morning) hawking, cardialgia, and very painful efforts to vomit. We shall return to this morbid state in connection with certain plants of the family of the compositæ, especially chamomile, which are more suited to this class of indisposition than anise and its analogues.

Aniseed tea, or the seed covered with sugar ("Anise de Verdun"), and the essential oil of anise, are the forms in which the remedy is most used. The last may be very advantageously added to calming, carminative, purgative antispasmodic draughts. The "baume de soufre anisé" is composed of sulphur and the essential oil of anise: it is given in chronic pulmonary catarrh. The eau génèrale, the carminative spirit of Silvius, the catholicum, etc., contain this oil. The infusion is made with from 8 to 12 grammes (ʒ ii.—iii.) to 500 grammes of boiling water (a pint).

The fruits of anise (vulgarly known as seeds) have produced severe symptoms, which have been explained by an admixture of those of hemlock; the latter are distinguished by their whiter color and their slightly crescentic shape.

Angelica.

After what we have said of anise, there is little to add concerning angelica, except that it has more marked tonic properties, which make it more advisable in mucous affections, catarrhal fevers which are followed by profound languor of the stomach, and an interminable tendency to that whitish pultaceous secretion which then coats the buccal membrane, the presence of which is both the cause and the effect of that despairing inertia of the digestive force which produces endless convalescences and may cause a multitude of later troubles. The infusion of the young shoots of angelica is then of evident service. The insurmountable nausea of patients is often relieved by the excellent flavor of this plant in infusion or chewed as prepared by confectioners. This step being gained, angelica develops its virtues; the stomach, the buccal mucous membrane, assimilate the saburræ which lessened their sensibility; the latter resuming, by degrees, its vigor and type, its secretion recovers its ordinary character, the appetite is restored; and this is the point sought, for as soon as it can be satisfied the nervous troubles disappear; the frequency of the pulse, the partial and weakening sweats cease, and the strength returns. It is easy to see where angelica may be of use, where anise and other unbelliferæ would have been valuable. The mixture of this plant with the common food, as is practised by some nations, shows better than anything we could say its stomachic

and anticolic virtues. Its alexiteric virtue is doubtless ascribed to it on the ground of its sudorific action, though, according to Pringle's experiments, it ought to possess essentially those properties.

As analogues and succedanea of anise and angelica, which we have adopted as types of the therapeutic action of this class, we must mention parsley (Apium petroselinum), which we perhaps ought to have classed with the special excitants of the urinary secretion; chervil (Scandix cerefolium), which has been given very often as a depurative in diseases of the skin; as an aperitive, deobstruent, and anti-icteric in the organic diseases of the liver and the dropsies which depend on it. This action is much assisted by its power, when used as a cataplasm, of resolving certain external engorgements, in diseases of the mammæ, and in fumigations in cases of painful hæmorrhoidal tumors, in which we have often seen it successful, relieving the tearing pain which is then felt, and making the hæmorrhoidal tumor return. The smallage (Apium graveolens) forms a part of the syrup of the five aperitive roots: the coriander (fruit of the Coriandrum sativum); the fennel (fruit of the Anethum feniculum); the caraway (Carum carui); cummin (Cuminum, cyminum); dill (Anethum graveolens), etc., etc. The last five umbelliferæ, the fruits alone of which are used, are nearer to anise than those before enumerated; the mode of administration and the doses are the same.

The family of the Magnoliaceæ contains a plant of which the therapeutic properties are the same as those of officinal anise, and which we must mention here as able to replace the latter entirely; it is the badiane or starred anise, a tree growing in China and Japan. The fruit is used in the doses and under the circumstances above indicated.

Balm.

The name *melissa* was given to this labiate because of the preference which the bee (μέλισσα) shows for it. The author of the "Georgics" recommends bee-cultivators to spread it about the places where they wish to attract these insects:

> "Huc tu jussos asperge sapores,
> Tritu melisphylla et cerinthæ ignobile gramen."

The genus melissa contains several species, among which the officinal, m. officinalis, also called citronnelle on account of its agreeable smell of citron, which it communicates to the fingers when touched, is the most known and the most used. Its taste is warm, piquant, aromatic. It contains an essential oil, white, to which it owes its efficacy. Water and alcohol dissolve its active principles: "*Nervine, cephalic, exhilarant.*" Balm comes to us from the remotest antiquity with these three titles, which include all its therapeutic virtues.

These expressions need to be defined; not that we desire to retain them, or rather, to bring them back into pathology, but once for all, we must state the ideas they hide, not only because these ideas are not at all absurd and remain founded in spite of their abuse, but because the words are found on every page of the ancients, and it is well to understand them.

The vice of the term "nervine remedies" consists (it is said) in its unlimited extension. It means nothing, because it tried to mean too much.

The antispasmodics, especially with the restrictions which we have added, have doubtless a much less vague sense. Still, the nervines do not include all remedies applied to troubles of the nervous system. This expression has always had a limited and special value; it has constantly served to designate the agents which "warm" directly and agreeably the entire nervous system, or rather some part of the system. It is not the neuroses, the spasmodic element, that claim it, so much as the debilities, the atonies of the nerves, and particularly of the encephalo-rhachidian nerves.

We see that the progress of pathological anatomy, the increased precision lately introduced into the local diagnosis of disease of the nervous system of the voluntary muscles, have considerably lessened the number of cases in which the nervines formerly seemed indicated. Thus, they were chiefly given in paralysis of voluntary motion and of sensation, and modern research has reduced the majority of these paralyses to symptoms of organic affections which are most usually irremovable from the brain.

But this should not justify us in absolutely repelling the modifiers of the nervous system. Happily, we are not always obliged to find in diseases of the nervous centres or their dependencies these material alterations which are the despair of true medicine; and it is then that treatment has an immense field, in which the nervines may share. It may even be proved that the use of them is not so irrational as is pretended in the circumstances named, which would seem beyond their power.

The nervines were the first medicines used. It follows that they were first used externally and in surgery.

The most renowned warriors, in whose hands was placed the medical practice of camps, used them as vulneraries (consolidantia) and antiseptics (condientia), because these plants were used for embalming and preserving bodies. The appearance, smell, and products of wounds gave rise to the idea of partial death and decomposition, and in treating them it was natural to use the remedies which succeeded so well in the preservation of dead bodies from putrid decomposition.

It is true that, having almost always to treat simple solutions of continuity, destitute of specific character, which furnished no other indication than reunion, cicatrization was impeded by placing foreign bodies between the divided surfaces; but this was long before Hippocrates pro-

claimed the truth that nature is the healer. Still we will say that surgeons have exaggerated the objections to dressing simple wounds by vulnerary remedies.

Certain fumigations of various oils, applications of balm and of balsamic fats to cuts, or tearing of the flesh, etc., admirably assist cicatrization and in similar cases produce the marvellous effects of caloric methodically applied to the treatment of wounds, when they heal almost without inflammation.

When the use of these remedies was carried from military into civil medicine, and applied in the cross-roads and the temples to the cure of "spontaneous wounds," ulcers of the legs, aphthæ, troubles of the eyes, etc., as is inscribed in most of the votive tablets preserved in the temples of physician-priests, real cures must have been obtained, for, in our time, lotions, ointments, collyria, collections prepared with some aromatic and excitant plants are successfully used in very many like cases. They were at least given internally, and Hippocrates knew and prescribed the great part of the labiatæ in infusion.

The nervines are, then, remedies which have the property of awaking and maintaining the nervous action of the organs and apparatus of the life of relation ; and their chief reputation is derived from direct application made to the part, though their internal use and their effects produced by the medium of the circulation and innovation have very often been used for the same purpose. Their external use also extends to all neuralgias of the limbs and the organs of sense.

Among the legitimate uses of the nervines, and of balm in particular, we will indicate its use internally in muscular debility, and dulness of the senses, observed in the convalescence from long sickness ; in the headache of delicate and nervous people, the transient clouds before the eyes ; the noises in the ears, and the vertigoes which, in woman, and in men whose occupation is intellectual, are not the result of plethora.

Excellent physicians have successfully prescribed it in the morning fasting, as tea, for gross and apathetic old men.

Its external use is chiefly by friction in apyretic rheumatic pains, vague neuralgia of moderate severity, upon the limbs and around joints which have long been condemned to rest for fractures and dislocations ; in lotions, in commencing weakness of sight ; placed on cotton in the auditory meatus, it may quiet earache. Tremor of the hands and head are among the affections which the nervines, especially balm, have the reputation of making less severe, or stopping. In the latter cases its essential oil should be used. It may well be that the consoling frictions which are performed with this oil in sciatica, muscular rheumatism, etc., act only as revulsives, for they quickly make the skin red. Dioscorides ascribes to balm the power of curing the sting of scorpions, and the bite of poisonous or mad animals. At present it is popular to wash the stings of bees and the bites of adders with it; and honor is paid to the distilled water of balm on account of the improvement which almost

always follows spontaneously. Galen called balm a substitute for horehound, and in consequence erased it from the "Materia Medica," so to speak.

Ætius, Oribasius, etc., copied him in this, without even changing their master's expressions. But horehound has a very different action. The other uses of this plant are dependent on the two properties which we shall next study.

If the term *cephalic* be applied to all remedies which can be used for troubles in the head, it should be excluded forever from medical language; but if it be restricted to some therapeutic agents which, by the sense of smell, and more rarely by the mouth, dissipate easily, instantly and directly a considerable number of cephalalgias, but which especially stimulate the brain rapidly and agreeably, as an organ of the thinking faculty, this term may be allowed without inconvenience.

The authors who have used this word have implicitly assigned to it this sense, though without ever formally announcing it. It is evident that, in order to act thus, the cephalics must possess a pleasant smell, rather diffusible and penetrating; these properties are possessed by all of them, and by melissa in particular, as is shown by the immense reputation of the famous Carmelite water.

In acting on the sense of smell these remedies have two methods, which unite to form one result. This double action occurs when we inhale by the nose cephalic powders like marjoram, etc. By their chemical and physical properties, these powders make an irritant impression upon the general sensibility of the Schneiderian membrane, which it possesses in common with all mucous membranes, and we know how this impression wakes up the sensations and stimulates all the cerebral phenomena that are in relation with the intellectual functions. By their acute and agreeable odors, also, they act on the special olfactory sense of this membrane, and every one has felt the powerful influence of agreeable emanations upon the mental disposition and the shaping of ideas.

It might be said that the first of these dispositions belonged to simple stimulation of the brain, and that for the second were reserved those special pleasant and cheerful effects which the Orientals are always fond of inhaling. These two distinct actions are found—the first in the effect of nasal titillations, or the smelling of hartshorn, in syncope; the second, in the voluptuous impression which the senses receive from a breeze which has passed over roses. The latter may go to the point of producing vertigo and intoxication, especially in the case of certain balsamic plants. In all respects, snuff-tobacco is a potent cephalic lead.

The perfumer, rather than the physician, controls these substances; and everybody prescribes for his own nose. Balm enters into the composition of a great many cephalic smelling-waters. Their internal use agrees with what has been said of the like mode of administering nervines. Compare what we have said of the efficacy of the fetid gums in other cases, and the virtue ascribed to the cephalics, and it will not seem un-

reasonable to suppose that the odors, or rather the emanations and effluvia of certain stinking substances, have upon the ganglionic system effects opposed to those which pleasant odors produce on the cerebral system. Homœopathy has renewed the cephalic use of medicines, but under conditions and with claims so out of the range of our therapeutics that it would be idle and undignified to speak of them.

It remains to speak of the *exhilarant* effect ascribed to certain remedies, and balm in particular. The expression is still older than the two preceding. It carries its own definition with it, and signifies medicine that causes joy. Are there any agents, non-alcoholic, which are capable of producing gayety, of dissipating ennui, of opening to the imagination a future full of delicious illusions, etc? We would not claim this. All the remedies which comfort or restore health are followed by these happy effects, and give to the patient joy and hope; but we are not speaking of what disperses sadness by relieving the morbid state which causes it. To deserve the title of exhilarant, a medicine must give joy to the soul directly, in a specific way, and when the sad, melancholy feelings are, so to speak, idiopathic. These remedies would be principally applicable to the treatment of the atrabilious, the hypochondriacs.

May they be useful by stimulating the brain of such persons, by animating this organ and leading it to outer things, by turning it off from that fatal direction which it has taken, in which it occupies itself with sensations, studies actions, spies after phenomena which nature conceals from his investigation and power?

Or may they be indicated in that atony of the gastro-hepatic system, in that nervous and spasmodic-flatulent state of the pelvic viscera and the hypochondria which, whatever may be said, is almost always the origin of the affections we are speaking of? These two influences may be admitted in the cases where the exhilarants deserve a special place in therapeutics.

Melissa is proclaimed as one of the best *exhilarants* by a great many very ancient, and by many more modern authors. Serapion says that it "removes all inquietudes and imaginations from the brain, especially those proceeding from melancholic humors; Avicenna, that it "rejoices the heart and fortifies the vital spirits." Dioscorides almost always reckons it among those plants which have most power to open the conduits of the brain and drive off the morosities caused by thickening of the nervous fluids; Fernel, whose enlightment is quite another thing from that of these writers, speaks of balm in these terms: "Demulcet atram bilem; confert ad timores et tristitias quæ occasione nulla ex atra bile suscitantur lætraque facit omnia," etc. We omit a crowd of other like testimonies, and will only say that we might find them in Forestus, Rivière, Hoffmann, etc. These authors add that it sharpens the wits and improves the weakened memory.

It is at least harmless to give infusion of balm or a few drops of the Carmelites' water in a glass of sugared water for the cerebral or hypochon-

driacal troubles we have named. It is a blessing to be able to dissipate for a few instants the strange disturbances or the invincible melancholy of the latter patients by so inoffensive a remedy, which may really have influence, both by its intrinsic qualities and by the confidence which its great fame must occasion in the hypochondriac. We also think that by analogy it may be recommended for the use of old men, whose mental faculties vacillate and are weakened like their limbs, and like all the functions which depend on the brain.

Mint.

This is a plant which, from the nature of its sensible physical qualities, has been employed from the remotest times. Hippocrates knew it and seems to have used it as an excitant, for his treatise on regimen ascribes to it a property to which we shall return. Dioscorides also attests its stimulant action: "Mint has the virtue of warming, contracting, and drying."

Galen praised it chiefly as an aphrodisiac, which is the more surprising, as many consider it suitable to weaken the stimulus of the genital organs. "Vim calidam habet," says Ætius, but he placed it only in the third order of warm substances. The excitant properties of mint are universally affirmed; its specialty of action and the most unequivocal indications have also always been admitted. For instance, its carminative effects were so well known at Rome that Martial gives it the name of "Mentha ructatrix." Its power is, indeed, prominently evident in the spasmodico-flatulent disorders. It has also some advantages which we do not find in the scented umbelliferæ. The labiatæ share with the latter only their antiflatulent and anticolic powers, but they possess, in a higher degree, a diffusible excitant action which resembles that of camphor and the ethers.

We must faithfully distinguish the very special varieties of morbid states or pathological elements which may be combated by the labiatæ, especially mint. When these things are laid down in respect to mint, we shall only have to name the other labiatæ which may be substituted for it; adding in each case the mention of special virtues.

We have said that mint may represent that therapeutic group of the labiatæ, which seem to owe their properties to the camphor contained in their essential oil. When speaking of the materia medica of this family, the great part of their virtues are referred to this section; and though it is admitted that the chemical and medicinal virtues which distinguish this section belong to most labiatæ and are found in a multitude of other classes which possess additional virtues, we think our division a legitimate and natural one.

Peppermint has the most decided virtues of all the plants of this class. Its diffusibility makes it applicable to several morbid states where we have already spoken favorably of the use of ethers and camphor. We will name

in particular nervous vomiting, spasmodic gastrodynia, the colics of the same nature seated in the right hypochondrium or the region of the kidneys. The infusion of peppermint also succeeds wonderfully in the cases which we have pointed out in reference to castoreum and camphor, and which consist of painful and difficult menstruation with chills, yawnings, various spasms, and in particular tearing uterine colics. This pleasant drink causes a more equal distribution of heat, procures a gentle moisture of the skin, and makes the menses flow in a continued and peaceful way.

Chlorotic young girls are subject, especially just after eating, to very sharp gastralgia and subsequently enteralgia; the infusion of mint drunk in place of tea prevents or dissipates this. Taken shortly before eating, it provokes a natural appetite which patients satisfy with legitimate and reparative food rather than with the crude and acid substances which chlorotic persons fancy. The palpitations of the heart, the nervous trembling, the hiccoughs, the slight cephalalgias and migraines, are quite well relieved in these cases, and in most vaporous women, by hot infusion of mint. We have already spoken of its carminative virtue; it is most proper to use it in the nervous flatulency and meteorism of the persons we have just named.

As a ptisan or ordinary drink, it enjoys a merited reputation in primary nervous fevers and in typhoid fever which assumes the nervous form. The same must be said of catarrhal fevers, when an element of general atony dominates, especially in the mucous membranes. This habitual drink is also indicated in typhoid fevers, which assume the mucous form, as observed by Rœderer and Wagler. Excellent observers have stated that exciting drinks hinder this form of grave fever from assuming the putrid and nervous character toward the later periods.

Mint tea is a common drink, very useful to anæmic women, and in convalescence from severe diseases, for a great many nervous symptoms, insomnia, inappetence, dyspepsia, etc.

We have never used any other drink in the period of collapse in Asiatic cholera, and it is entirely suited for all excessive fluxes which seem to be controlled by a grave and deep nervous and spasmodic state, in the midst of which refrigeration rapidly occurs, with small and irregular pulse, great inertia of the respiratory functions, extinction of the voice, a sensation of burning heat concentrated in some visceral cavity, contractures or partial convulsions, etc., for these symptoms are not characteristic of Asiatic cholera alone, but to all exaggerated fluxes, and certain sorts of pernicious intermittent fever.

Children are subject during lactation, and especially after premature weaning, to vomiting, often of a dangerous kind. This symptom usually indicates only gastric atony with spasms, when the little nurslings have been deprived too soon of their natural food. At other times, the obstinate vomitings announce a commencement of softening of the gastric mucous membrane. In these two cases, distilled mint-water, syrup of mint, renders us daily precious services. We cannot be too quick in relieving

this vomiting in weaned children, for if they are treated by diet, emollients, etc., we only increase the tendency to vomit, and the children fall very quickly into a cachexia which begets phlegmasiæ and softenings which rapidly disorganize.

The antilacteal property of mint is not known to us. Dioscorides attests it; and Desbois of Rochefort, in our time, also mentions it. This property consists chiefly in the fact that mint, taken in infusion by newly delivered women and applied in fomentation to the breast, prevents a new secretion of milk, neutralizes the lacteal diathesis of the system, and opposes the symptoms attributed to the latter. These assertions have been made a thousand times since Dioscorides, but are not founded on very severe observation. The Father of Medical Botany says that "the leaves of mint, thrown into milk, prevent its clotting, and turning to cheese." This is doubtless the fact upon which is based the prescribing of mint for women who wish to dry their milk. We have ascertained, by experiment, that the coagulation of milk is retarded when a few leaves of mint are thrown into it, and the same fact is recorded by Laewis in his "Matière médicale." We cannot contradict Linnæus and many other authors who say that cows who eat mint in the field have a much more serous milk.

Hippocrates noted a peculiarity of the effects of mint, which might be inferred from the presence of a large quantity of camphor in it; that is its anaphrodisiac effect. He speaks thus in his treatise "De vict. rat. in ac:" "Si quis eam (Mentham) sæpe comedat, ejus genitale semen ita colliquescit ut effluat, et arrigere prohibet, et corpus imbecillum reddit." Aristotle spoke of the same action, perhaps on Hippocrates' authority; but Dioscorides spoke of mint as "a brewage which incites to the pastime of love," which Galen repeated, perhaps, also, on the faith of Dioscorides.

After taking a strong dose of mint, we have not felt those enervating effects upon the sexual apparatus of which Hippocrates speaks; but we did not fulfil the condition mentioned by him: "Si quis eam sæpe comedat," etc. The opposite effects, also, did not appear.

The other species of the genus mentha are not important. Curled mint (m. crispa) is less active than peppermint (m. piperita), of which we have just written. Pennyroyal (m. pulegium) is said to have a special action which makes it useful in convulsive coughs, especially whooping-cough. This reputation comes from England. It may be safely made the vehicle of the draughts which we give to children in whooping-cough, and may even be prescribed as a drink.

Hyssop, Germander, Horehound, Ground-ivy.

These labiatæ form our third therapeutic group, which we have said was characterized, independently of the qualities due to the volatile oil

and which are common to all, by the existence of a considerable amount of a bitter principle, which gives these four plants their special action. Hyssop contains also a little camphor ; but it is more like the tonic and bitter labiatæ than the preceding ; its reputation is entirely based on properties which authorize the position we have given it.

That which we shall say may be applied to all the plants of this section; nevertheless, we shall ascribe the most marked virtues to white horehound and ground-ivy; we shall mention the special indications in connection with each of the four plants.

The chronic diseases of the lung, especially catarrh and phthisis, have given occasion to great praise of horehound, ground-ivy, and hyssop. The wonderful means of diagnosis which Laennec has placed in our hands must make us very reserved in believing the marvellous statements of the efficacy of horehound and ground-ivy, especially in consumption or tuberculous degeneration of the lungs. But we do not wish to annul all that has been said and taught by daily experience, of the useful and palliative qualities of these agents.

If there is any fact that seems certain to us, it is that pulmonary phthisis, formerly less known in its character, its varieties, and its anatomical phases, was much better known in its etiology, its varieties, its pathological phases, its therapeutic indications, and its treatment.

At present, when the degree of the pulmonary lesion has been carefully ascertained, all is supposed to have been done. The balsamics and the bitters held an important rank among the remedies opposed to phthisis, in old medicine. May we not presume that the labiatæ which we are studying in this section owe a part of their beneficial effects in chronic catarrh and phthisis, especially the sort which Morton called " scrofulous," to the fact that they are characterized by the union of a bitter principle and an aromatic principle which has an analogy with the active part of the balsamic substances which are reputed as pectorals and antiphthisics ? This view seems to us to have a basis. We know also that sulphur and its preparations have incontestable efficacy in these affections. It is not without interest to note that Hyssop, which all practitioners use in these cases, contains a considerable quantity of sulphur united with an essential oil and the bitter principle—three agents often successfully combined, especially in the treatment of phthisis and chronic catarrh. These labiatæ would thus constitute natural Morton's pills.

However this may be, the indication for excitants and bitters naturally occurs in those diseases where the general system, and the lungs in particular, are controlled by a diathesis which is developed by all enfeebling causes, the effects and the products of which are less rapid and abundant in proportion as the system is surrounded by conditions and influences which give predominance to a constitution the opposite of that in which tuberculous diseases originate. These conditions and special influences invariably impart a stamp of debility, of poverty of the assimilative forces, profound etiolation, etc.

There is no difficulty in giving the most powerful bitters in all manifestations of the scrofulous cause elsewhere than in the lungs; yet if this cause deposits such products in the latter, the physician stops, and changes his remedies, as if the disease had changed its nature. This, however, is not always wrong.

In chronic pulmonary catarrhs, and in the decline of acute catarrhs, which are slow in going off and affect a chronic character, there is unquestionable value in the infusions and syrups of the bitter labiatæ. So in the last stage of pneumonia, when all fever and all pneumonic aspect of the sputa having passed away, a little cough and catarrhal expectoration remains; while auscultation reveals mucous or subcrepitant râles which witness to a phlegmasia which has not been thoroughly ended, or to congestion, or œdema; while also the strength and appetite are imperfect, as is especially seen in the old, in persons previously enfeebled, in whom, through the violence of the fever and inflammation, abundant bloodletting has been practised.

The state we describe is very common, and is quite well relieved by wine, good food, and bitters.

The most active of the tonic and pectoral labiatæ are horehound and ground-ivy. Hyssop has the advantage in asthma and the nervous affections of the respiratory organs, perhaps because its composition more resembles that of the labiatæ of the preceding group.

Germander is more used in chronic disease of the liver, dropsy, the cachexy of prolonged intermittent fevers, atony of the digestive tube. Dioscorides praises it in "hardness of the spleen, difficult urination, and commencing dropsy," etc. This agrees with what Fernel says: "Viscera, præcipue jecur, expurgat, obstructionibusque liberat, . . . ictericis auxilio est." It was very anciently designated in Italy by a name signifying the herb for fevers. In England it has still a great reputation as a febrifuge. Lazare Rivière reports that peasants of the environs of Montpellier have been very well cured of quartan fevers with powdered germander. There is probably some relation between this property (which it shares with other bitters, as chamomile, lesser centaury, etc.) and that which the Greek and Arabian authors have always said of its deobstruent action on the viscera, and especially on the spleen: "Lienem absumit chamædrys."

Professor Chomel quite often gave infusion of germander in convalescence from typhoid fever with the adynamic form, and at the end of all acute disease which is followed by a state of languor and deterioration of the organic functions.

Without counting on the antiasthmatic and the anticatarrhal virtues of hyssop in affections of the chest, for which it has been praised beyond bounds, it may be made the excipient of potions containing more heroic agents, and may be given in infusion as an ordinary drink to asthmatic old men subject to catarrhs.

Horehound and ground ivy were formerly almost uniformly praised in

phthisis, and the old practitioners attributed to them the cicatrization of pulmonary caverns, "the drying-up of scrofulous abscesses of the lungs," etc.; but these exaggerated accounts have led to mistrust and abandonment. We give little trust to all that Alexander of Tralles, Cœlius Aurelianus, and Celsus say of the efficacy of horehound in phthisis. The latter author laid down admirable rules and precepts for the treatment of this disease. He recommends horehound, but combined with substances which may claim a great part of the effects. He added turpentine: "resinæ terebinthinæ pars dimidia." The more special cases which call for the use of horehound are those in which ammoniac is recommended by us, that is, pituitous asthma, where the cessation of the attacks seems subordinate to the evacuation of thready and transparent mucus. It has not only this affinity of therapeutic action with ammoniac, but a little of its fetor.

Does the small quantity of iron contained in this plant justify the importance that has been attached to it in amenorrhœa and scurvy? Nothing need be said of Chomel's cases of cancers of the liver cured by horehound. Linnæus speaks of it as an efficacious remedy in mercurial ptyalism.

Ground-ivy is, of all the bitter labiatæ, that which has kept the most popularity; we will not repeat all that has been said of its marvellous properties in the chronic diseases and organic alterations of the lungs. Morton said that in hæmoptoic phthisis it was used in large doses and for a long time. It was the syrup of ground-ivy that he then praised: "Magis vero (saltum in hujus morbi initio et post recentem hæmoptoen) syrupo ex hedera terrestri (quem in phthisie hæmoptoica præ cæteris omnibus commendatum vellem copiose usurpandum), insistendum est." The fact of hæmoptysis here gives value to the diagnosis, and consequently to the treatment of the celebrated author of the "Phthisiologie." It will be best to use ground-ivy in all the cases which (as we said) are related to the bitter labiatæ.

Sage.

The Latin name for sage (salvia, from "salvare") is a testimony to the prodigious reputation it has had. It was also called the sacred herb, according to Agrippa and Ætius. The school of Salerno was the last echo of this incredible fame; it consecrated Sage as a remedy capable of making man immortal, or, perhaps, as the adage is in verse we may interpret it as referring to longevity: "Cur moriatur homo cui salvia crescit in horto?" If, like the school of Salerno, we could proclaim that "Sage is the best remedy against death," we need say nothing more.

What is said of the two species of Teucrium which we unite in this description is hardly less marvellous. Pliny says the following of t. marum: "At this time Teucer dicovered teucrium. The herb was discovered thus: Having once thrown upon some of it the viscera of a beast, it was seen that the herb attached itself to the spleen and consumed it; for this rea-

son some called it splenion. It is said that in hogs which have eaten the root of this herb no spleen is found," etc.

We confess that if the resolvent and deobstruent properties of teucrium marum originated in this story, we might dispense with telling them. We had rather believe that the story was built up to give increased credit to the properties which were already recognized; for, though we cannot add the testimony of our own experience to that of our predecessors, the evidence is too full and respectable to be absolutely rejected. The physical and chemical powers of marum are very marked, and it is nothing surprising if its medical powers can also be utilized. Cullen, who tried to deny the virtues, at least the special virtues of most of these plants, admits of marum "that it is the most powerful cephalic and antispasmodic of the verticillates." Galen's statement of the alexiteric virtues of teucrium scordium is less incredible than the preceding fable: he says (according to credible report) "that after a battle, the dead who fell upon plants of scordium were less putrefied than the others, especially on the side which touched the plant."

Scordium kept enough of this reputation as a potent alexipharmic to lead Fracastorius, at the middle of the sixteenth century, to make it the base of his famous composition called Diascodium, the formula of which has been so often remodelled that it is doubtful if the electuary deserves its original title. At present it is chiefly used on account of the opium it contains.

We shall confine ourselves to mentioning the most special and unequivocal properties of sage and its analogues; because the general action which these plants share with all the excitants will be better developed and appreciated after we cast a general glance at excitant treatment.

"Alexipharmic" means a poison-expeller; and the term was formerly used to designate all agents which keep from putrid, contagious, and infectious diseases, and which are reputed to cure them. Sage held an important rank in this class of remedies. For us, the properties of that sort which we recognize are those which may be made useful in the mucous form of typhoid fevers, a badly defined form which rarely exists alone, but more often in company with a state of languor and erethism which much resembles the slow nervous fever of Huxham, a circumstance which by no means contraindicates the use of sage, but rather calls for it. This form easily turns to putridity, and then presents great analogies of symptom with hospital or gaol typhus, or even the oriental form. The infusion of sage, or of one of the two teucriums, gives more stability and resistance to the nervous system when stricken with stupor and ataxia; it at the same time makes the circulation active, and gives the patients fever—a fever which is, in a certain degree, indispensable, under pain of premature decomposition of the organism and death by miasmatic poisoning and want of reaction, or under pain of exclusive predominance of the nervous accidents, and of death by vicious reaction. The infusion can also be given in the purely adynamic form of these fevers. The diarrhœa need not be

feared; sage and the scordiums are even suited to check it. Hippocrates said of the grave fevers: "Salvia sicca est, alvum sistit." This antidiarrhœic effect is common to the great part of the aromatics. Its bitter and astringent qualities may contribute to this. The least doubtful advantage of diascodium is that it suspends the intestinal fluxes.

It seems a contraindication in the case of sage that it possesses not only very active sudorific powers, often used to advantage when an imprudent exposure to cold brings on illness, and chills which are sometimes the precursors of inflammation or of muscular rheumatism, and when we wish to break up this commencing fever by free sweating; but that it is also recommended for checking immoderate and weakening sweats. This is no contradiction, however, for the circumstances in the two cases are exactly opposite, and the same reason which makes it act one way in one case, makes it act the contrary way in the other.

Van Swieten successfully prescribed the wine of sage in night-sweats, which so injuriously weaken convalescents from fevers. This indication often exists after grave acute diseases. In these cases sage, according to Van Swieten, also lessens the rate of the pulse. He says he has never seen the effect fail which he desired—the cessation of the general weakness and the relaxing sweats which are a symptom of it. He used it in the galactorrhœa which continues after weaning, and often cause a true hectic fever, a marasmus, to which some succumb. Sage is said to have this property in common with mint, but more surely, doubtless owing to its tonic and astringent action.

The cicatrizing virtues of sage are indubitable, and we have repeatedly seen atonic ulcers of the legs grow firm, cover themselves with a new cutaneous tissue, when compresses have been applied with wine boiled with sage and honey or even a simple decoction of sage. Such dressings are very useful in scrofulous ulcers of the cheeks. It is very certain that we can drive away the aphthæ of children or pregnant women by touching them with a brush dipped in a vinous decoction of sage. Rosen says that the cure is much surer in the case of children if we give internally some teaspoonfuls of the infusion while using it topically upon the aphthous ulcerations. This infusion is also good as a collutory for softening and bleeding of the gum.

Sage, and in a somewhat less degree, marum and scordium, summing up the isolated properties of the other groups of the labiates, form a species of natural theriaca, and seem to us very well adapted to replace that old electuary. We have still much to say in the last section of the labiatæ.

Sage is given like all the other plants of the same family.

We have reserved for the end that which concerns a pretty common use of the labiatæ, which may be made valuable; and if we did not speak of it under any special one, it is because this mode of administration is usually made with a mixture of several, but principally the most aromatic, as sage, mint, lavender, rosemary, thyme, etc. There is a question of

their use in the form of local and general baths, and of sachets applied to the skin, or of a mattress for certain patients to lie upon. These two ways of turning to advantage the exciting and tonic virtues of the labiatæ are applicable in the same circumstances, and if the dry form is sometimes preferred, it is because many patients, in the cases which present the same indications, cannot bear baths, and because the prolonged humid form, by the relaxation it causes, undoes the fortifying action.

The local application in the two ways described is resolvent in all chronic engorgements, especially in scrofulous tumors and cold abscesses; in articular stiffness with or without swelling, following rheumatism; to limbs which are passively infiltrated in convalescence, and in essential anasarca consecutive to certain exanthemata, intermittent fevers, etc. The baths of the aromatic labiatæ and the beds made with these plants are useful to scrofulous children when the signs of the strumous diathesis predominate over the local symptoms; also in the convalescence of children after exanthemata, which often leave them greatly wasted and in a very obstinate cachectic state. We can also use these methods in white swelling, in caries of the vertebræ, etc.; in a word, in all the states of the system that are characterized by general weakness and relaxation of the solids, and imperfection of assimilation, whether due to special causes, as the scrofulous diathesis, etc., or destitute of special mark, and due to all the causes which are able to impress upon the nutritive forces a profound atony in which all the functions share.

Chamomile.

Those who boast of a classification of remedies which is not arbitrary may be asked where they place chamomile. Is it antispasmodic in the way in which we have defined this quality, or a proper stimulant, or tonic? There would be excellent reasons for classing it in all three of these at once, and we profit by this latitude to do so. This is the more permissible, as the morbid states which require it are partially the same, partly analogous to those which we have mentioned *à propos* of the umbelliferæ and the labiatæ.

Chamomile was the cinchona of antiquity; we now possess a much surer febrifuge, but this remains the possessor of special excitant properties, the most interesting of which, and the least questionable, is the *stomachic.*

This epithet is not applicable, as has been said, to all remedies which cure troubles of the stomach. Bleeding, blisters, cold affusion, etc., will never earn this title, which is applicable only to remedies which, taken by the mouth, are capable of giving directly to the forces of the stomach the degree of energy which suffices to accomplish its functions, when these forces are in a state of idiopathic inertia essentially constituting the disease, or when they share the general debility of the system, and this de-

bility presents indications for the tonic or excitant treatment. If we abstain here from discussing the nature and importance of these indications, it is because they form a part of those which excitant treatment may fill. We speak here only of the special properties of chamomile, which are not necessarily the result of its stimulant action.

The most important of these properties is its febrifuge action. We have already said that before the discovery of cinchona much use was made of chamomile to suspend attacks of intermittent fever. Though neither Hippocrates nor Celsus mention it, its virtues as a febrifuge were known very anciently, for Galen says that the sages of Egypt, called Magi, devoted it to the Sun on account of its notable efficacy in fevers. Dioscorides advises to powder the flowers and give the powder "to remove the attacks of fever." According to Ætius, an Egyptian named Nechepson, doubtless the one whom Mattioli calls Nichessor, directs as a cure for fevers that the patient be rubbed from head to foot with oil of chamomile. But the condition which it requires, of covering him up well afterward and evoking abundant sweats, invalidates the conclusion which he might here draw in favor of the febrifuge virtues of chamomile, for the vapor-baths and the strong sudorifics were sometimes successful in relieving intermittents which had resisted all other remedies.

Grave authors, versed in the knowledge of intermittent fevers, have obtained with chamomile the perfect cure of well-marked periodic fevers. We omit, as liable to seem unauthentic, a crowd of stories of these cures, down to the time of the discovery of cinchona. The illustrious R. Morton, like all the practitioners of the end of the eighteenth century, living, as we may say, upon the borders of the reign of the old febrifuges and the first successes of the new specific, often had to use both. He says that one of his colleagues, Elisha Coyth, told him he had often proved the great efficacy of chamomile flowers finely pulverized, which he considered as certain in the treatment of intermittents as cinchona itself. For his part, he says he never used the remedy alone and pure, but had derived remarkable advantages from associating it with other substances in the following proportions:

"Florum chamæmeli subtilissime pulverizatorum (plus minus pro ætate) scrupulum unum; antimonii diaphoretici, absynthii, utriusque scrupulum dimidium; pulvis sumendus in haustu ptisanæ vel cujuscum que julapii temperati; aut in formam boli cum syrupo caryophyllorum, vel in formam pilularum cum mucilagine redactus, sexta quoque hora per biduum vel triduum repetendus."

Thus given, the powdered chamomile flowers procured for Morton cures which Peruvian bark would not have obtained; he cites three striking cases worthy to be noted on account of the well-ascertained powerlessness of cinchona ("postquam diu et ad nauseam usque vires corticis peruviani expertæ fuissent"); and Morton, whose mind was convinced of the peerless efficacy of his dear Peruvian bark, made it a duty never to use succedanea until he had sufficiently proved its exceptional inertia.

The passage in which he makes this declaration is quite curious, and grave enough to be quoted: "Fateor equidem me nunquam (quod scio) in quocumque alio febre intermittente laborante hujus remedii periculum fuisse, quippe vix unquam (si recte meminerim) præterquam in hisce tribus ægrotantibus, antidotus illa herculea, cortex peruvianus, spem meam fefellit, proindeque nec licitum nec decorum esse duxi in humano corio experiundi gratia ludere, et certo atque experto remedio magis incertum et minus exploratum præferre. Utcumque formulam ejus describere, in gratiam curiosorum operæ pretium duxi, ut ii possint, modo velint, experiri, num hoc etiam sit certum febrifugum, vel saltem num (ut mihi evenit) vires corticis deficientes supplere queat."

These words of Morton's may form a rule for estimating the numerous antiperiodics, their therapeutic value relative to that of cinchona, and the fit time for their use. F. Hoffmann seems to us to fall into an inconceivable exaggeration, from superficial observation, rather than to utter the fruit of solid experience, when he pronounces in his dissertation "De Millefolio" that chamomile surpasses cinchona in the treatment of obstinate fevers, "longe tutius quam ipsa tantopere commendata China quæ ex remoto Peruviano regno ab aliquot inde jam annis tanto pretio redempta fuit." Hoffmann here falls into the error of those who believe that an antiperiodic deserves more confidence than cinchona because the latter has failed in a case where a substitute has succeeded. We add, that this great physician sometimes gives way to unpardonable enthusiasm and credulity.

It is a very remarkable fact that all the authors who have praised the febrifuge virtues of chamomile have constantly spoken of the powder of the flowers as the most efficacious preparation. Dioscorides, after enumerating several modes of administration, such as the infusion as an anticolic, emmenagogue, and diuretic, fomentations with the decoction as resolvents, anointing with the oil as a cicatrizant, collutories for ulcers of the mouth, etc., says at last, "they are reduced to a powder to drive off the accesses of fever."

The chief points of special note are the activity of this powder in case of the failure of the ordinary febrifuge (quando cortex frustra fuerit tentatus), an activity chiefly manifested when the attacks are irregular, the fever not due to the miasmatic influence of marshy lands, etc.; such are many vernal fevers, especially in large cities and in nervous patients. This circumstance is the same as the other, with an explanation, or rather a reversal; for this is the class of intermittents that chiefly resists the action of cinchona. Schultz has cited the case of a quartan fever which lasted thirty-six months and yielded to chamomile after having been long attacked in vain by febrifuges which are usually much more certain. "Pitcarn," says Cullen, "thought that chamomile flowers, *given in powder*, had as much value in intermittents as cinchona in substance. Hoffmann seems to have regarded them as an efficient and safe remedy; this led me to use them, and I found that, when taken in several doses during

the intermission, according to his method, the powder, in the dose of from 2 to 4 grammes (3 ss.—i.), and more, cured intermittents, but they have the inconvenience of easily passing by the stools when given in large quantity, which frustrates their purpose; and I have remarked that it was not usually easy to use them unless I added a narcotic or an astringent."

The infusion of the flowers is emmenagogue in the circumstances in which we praised the good effects of camphor, castoreum, etc.; also in the colics of the class which we have said were relieved by these two antispasmodics. We shall speak fully of this hereafter. But one observation shall be made which might else escape us. According to Cullen, the laxative power of chamomile often makes it useful, not only in windy and spasmodic colics, but also in dysentery, while, on the contrary, it is injurious in diarrhœa. This remark strongly confirms that which we were the first to establish, to wit, that diarrhœa and dysentery are opposites, that when the one ceases the second begins, and vice versa; an opposition upon which the rational use of purgatives in dysentery may well be founded.

The English sometimes use strong chamomile tea, drunk warm and in quickly repeated doses, to cause vomiting. Few drinks, thus taken, would fail of producing this effect. Its external use is hardly accepted, in spite of the great resolvent qualities which have been attributed to it, except in the various sorts of meteorism, especially that of dangerous fevers, where, fearing to give excitants inwardly, we still wish to restore contractility and tonicity to the intestines. In these cases camphorated oil of chamomile is rubbed on the bowels. This practice seems to us of doubtful use, and in tympanites, where the internal use of excitants is not to be dreaded, chamomile in infusion or injection has much more efficacy than in embrocation.

The infusion and decoction of chamomile flowers are the simplest and best methods of giving the plant. We have seen the cases for which the powder should be reserved. One of the best ways in atonic affections of the digestive organs (numerous and varied circumstances which offer, almost alone, all the therapeutic indications for chamomile) consists in steeping it cold for eight or ten hours, and taking a few cups of this chamomile water as sole beverage. The essential oil is also given in draughts. The distilled water may act as excipient in many cases. For enemata, the decoction of the flowers, or the oil, is used. The latter is the preparation used externally.

We will not speak of matricaria (m. chamomilla), which has properties very like those of the Roman chamomile, though less marked.

Wormwood.

Wormwood possesses in a higher degree all the properties of chamomile; hence the former is capable of fulfilling indications to which the second is inadequate, while it is sometimes contraindicated where the less

stimulant and more special action of chamomile suffices. Independently of the stomachic powers which chamomile shares with it, this plant owes its special repute to its emmenagogue and anthelmintic effects. For the emmenagogue action, see the section on Excitant Treatment.

Paludal fevers.—The febrifuge action is more energetic than that of chamomile, and may be shown in cases not reached by the latter. We said that the other had scarcely any febrifuge power except in nervous intermittents, of doubtful legitimacy, and chiefly of non-miasmatic origin. This is not quite the case with wormwood, which may succeed, especially as a preventive, in sorts where cinchona possesses all its power. In this respect wormwood shares the therapeutic action of all bitters, especially when, as is here the case, an astringent quality is added, as recognized by Galen; as we must admit that it is one of the best native febrifuges. It sometimes has power over obstinate autumnal fevers, accompanied by splenic and hepatic engorgement, œdema and ascites. Its very active tonic properties (for wormwood may very legitimately be placed with the tonics) also recommend it in the various cachexias and organic lesions which follow prolonged intermittent fevers; and in this way, also, it is useful in the treatment of chlorosis, amenorrhœa, etc.

Physicians will do well to abstain from wormwood when cinchona is, for any reason, forbidden. It was often of use to Pinel and Alibert; we shall not analyze all the authorities and facts which establish this virtue, for we shall have frequent occasion to do so in connection with other succedanae of cinchona. Wormwood is an agent which is too much neglected; we refer our readers to the various indications which the class we are now reviewing suggest, and also those of the tonics. The diuretic virtues of wormwood are sometimes useful.

It may not be wrong to say that poisonous and slightly narcotic properties have been attributed to this plant. It is certain that the liquor known as *eau* or *crême d'absinthe* intoxicates very readily, producing vertigo or a nauseated condition which does not belong to alcohol, but to the absinth (wormwood); this state repeats feebly and incompletely a slight intoxication by an acro-narcotic.

The action of this toxic principle has been demonstrated upon animals by Marcé. This conscientious observer, having given 2 or 3 grammes of essence of wormwood to dogs and rabbits, observed as effects, tremor, hebetude, stupor, insensibility, and all the signs of deep terror; with larger doses the animals exhibited epileptiform convulsions with involuntary evacuations, foam at the mouth, and stertor (Académie des Sciences, avril, 1864).

These researches were continued by Magnan, then interne of Marcé's and since physician to the asile Sainte-Anne. This skilful experimenter showed, by well-planned studies, that acute poisoning by absinth brings on epileptiform convulsions, which is never the case with drunkenness from alcohol. In the chronic poisoning of professional drunkards, wormwood also causes convulsions, but chronic alcoholism at length causes lesions, which in turn cause attacks of epilepsy.

If in the acute stage, an epileptiform convulsion allows us to accuse absinth with certainty, in the chronic stage it is otherwise; especially as brandy-drinkers do not usually despise absinth (Société de Thérapeutique, 5 février, 1869).

Cullen prefers the leaves of absinth to its flower-tips, because of the greater bitterness of the former. An essential oil is obtained which, in the dose of some drops forms a part of certain excitant draughts. The infusion, one of the most common of the preparations, is made with 16—32 grammes (℥ ss.—i.) of the plant to a pint of water.

The dose of the powder is from 8 to 16 grammes.

Wine of absinth is one of the most common preparations, especially when we desire to obtain a diuretic or emmenagogue effect; it is then used in white wine. There is also a conserve and an extract, a distilled water, etc., of which from 4 to 12 or 16 grammes (ʒ i.—iv.) are given.

It seems needless to give a separate article to mugwort (Artemisia vulgaris), a plant of the same family and genus as the preceding. It has had an immense reputation as an emmenagogue, and is still used largely for this purpose, all the special indications for mugwort will be studied under this head in the special chapter on Excitant Treatment.

The Artemisia maritima, a. pontica, a. abrotonum (citronnelle), have the same properties as the officinal sort. Tansy (Tanacetum vulgare) is chiefly used as a vermifuge.

As we go on in our account of the excitants, we find them more and more pure, less and less endowed with specific properties which can be referred to their exclusively stimulant virtues; for this reason we shall, in what follows, only give the materia medica, reserving for the chapter on Excitant Treatment in General the development of their common therapeutic influence. A few, however, will receive special attention as specifics rather than excitants.

Matico.

Matico is now little known medically, but is destined to take rank in our materia medica. It is used successfully in gonorrhœa, leucorrhœa, and in general in all the affections which are due to relaxation of tissue. In England it is, perhaps, the universal panacea for chronic flowings, especially that known as military gleet. The extract, combined with ferruginous preparations, produces excellent effects in chlorotic patients. Its balsamic and astringent virtues have a special action in hæmorrhages, obstinate discharges of blood, hæmoptysis; the most successful preparations are the syrup with the addition of extract or the infusion taken internally and in injection. Its styptic action is so great that the powder, applied to an open vessel, immediately coagulates the blood, and quickly heals the wound. In any case it must be given in a large dose in order to succeed most surely; it has no poisonous properties and never occasions accidents.

Dr. Lesaulnier of Paris, has used matico with much diligence and

success. The form preferred by him is that of syrup, more or less concentrated. After his example, we very often make use of this syrup, and have found his results confirmed.

In dyspepsia with gastralgia, especially in women, syrup of matico succeeds in the greatest number of cases. It is especially of value for pseudo-chlorotic women, who are so often injured by iron. In the debilities which follow painful pregnancy or prolonged nursing, the syrup is of much value.

It restores the digestive functions without causing the undesirable excitation which is so often due to iron.

It lessens leucorrhœa, which in the majority of women is such a trouble, and very favorably modifies the gastralgias which seem so closely related to this leucorrhœa. In a word, the syrup of matico, very recently introduced into materia medica, seems to us worthy of playing a very important part in treatment.

According to Gubler, it is suitable in certain dyspepsias, accompanied by symptoms of gastritis, especially in simple ulcer of the stomach, and even cancer of the organ, to quiet the pyrosis and prevent hæmorrhage. It is also an efficient hæmostatic in a great many cases of capillary hæmorrhage, especially when the exhalation of blood takes place from the organs which eliminate the resin and essential oil. It is prescribed in hæmaturia, hæmatemesis, melæna, and even metrorrhagia.

Matico may also modify certain ill-defined nervous states of sthenic or torpid character, and the muco-purulent secretions of chronic bronchitis, simple or complicated with tubercles.

Cubebs.

Blennorrhagia.—Cubebs were long used for merely their general excitant powers, until empiricism gave it an important rank in the treatment of a very common and obstinate affection which it might have been expected to exasperate horribly. The case is that of blennorrhagia, even in its newest and acutest form.

The Indians had long used it for gonorrhœa, when an English officer, who had an obstinate case, was relieved by his Hindoo servant with cubebs. This is the origin of the general and well-deserved reputation of this, one of the least uncertain treatments of blennorrhagia.

Its first success was in England about 1816. Drs. Crawfort and Barclay dispute the honor of this useful importation. Professor Delpech was the first among us, and mentioned it in a little mémoire inserted in the *Revue médicale* of September, 1818. This distinguished surgeon, and those who first used cubebs, here and abroad, proposed to give it as follows: Four grammes (3 i.) in the morning an hour before breakfast, 4 grammes at six P.M., and 4 grammes at bedtime. They made it an essential condition that the remedy should be continued after the suppression

of the flow to prevent relapses. It has been noted that the disappearance of the symptoms took place in the following order, which we have found correct in several instances.

The spontaneous pains, and especially the pains caused by urination, the redness, the swelling of the canal and its orifice, are first dissipated; and the first improvement is felt on the average at the end of forty-eight hours; then the blennorrhagic matter loses successively its character of virulence, and that of acute catarrh, to assume a more mild and more blennorrhœic character; at last the discharge, which is nothing more than the normal secretion from the urethra as regards its nature, though very much exaggerated, returns to its ordinary quantity, that is, is absolutely suppressed as a morbid discharge.

The known properties of cubebs made it at first dreaded at the commencement of claps, especially of those where the inflammation is high; but experience, based on thousands of cases, has put an end to this rational apprehension, and it has even been said (and according to our observation, very correctly) that cubebs acted with more force in proportion as it was given near the commencement, and in cases which seemed the most undesirable.

Those cases which seem very grave, from the intensity of their inflammation, the horribly painful swelling of the penis, the abundance and virulence of the discharge, and sometimes the fever, are in general much less so, and are cured much more readily than others which might be thought simple and easy from the mitigated character of the symptoms, the very slight local and general reaction, and especially the absence of pain and dysury and the benign look of the discharge. It is, then, proper to make less account of the rapid and perfect cure of the former class of claps, and to exalt the virtue of cubebs less; while in the second class, we may well praise it, for the malady is one of the most obstinate, and the least disposed to cease spontaneously or under any treatment, and the most liable to relapses, that we know of. It is the despair of patients and physicians.

The value of cubebs must have been very incontestable, and decidedly superior to that of the antiphlogistic treatment, to induce the most ardent defenders of physiologism to introduce this therapeutic doctrine into the domain of surgery, and to be the first to praise this remedy, which is so repugnant to their habits and opinions—and above all, so empirical.

We say empirical, for, in spite of the revulsive and derivative action which it is said to exercise upon the digestive canal or the skin, in favor of urethral catarrh, we are perfectly ignorant of the physiological mechanism by which cubebs in large doses cures blennorrhagia so well, and it is just this impossibility of seizing the phenomenon intermediate between the swallowing of cubebs and the improvement or suppression of the blennorrhagic discharge that constitutes the agent a specific, as we have elsewhere shown.

Nothing is so variable and fallible as the action of this remedy upon the digestive tube. To some it gives colics, and a little diarrhœa; but

with most others it causes no symptom of the sort. The eruption which sometimes appears on the skin is still more rare and insignificant. We at present prescribe it for two patients who notice no effects except constipation and insatiable appetite; in one of them the cure is nearly complete, in the other it is final.

Broughton, an English physician, has given in the *Bulletin des sciences médicales*, t. I., p. 95, a statistical account of the cures he has obtained in blennorrhagia treated with cubebs. Of fifty patients, ten were cured after a treatment of from two to seven days; seventeen in from eight to fourteen days; eighteen, from fifteen to twenty-one days; one on the fifty-fifth day; and the four others were not improved. Such results are very favorable in so difficult an affection.

It is difficult to decide whether, before administering cubebs, we ought to employ general bleeding, leeches, to the perineum, general baths, diluent drinks, when the symptoms of febrile action and inflammation are very much developed, with local pain and swelling. One point is to be observed: not to find an indication for bloodletting in redness, heat, swelling, pain in urination or during erection, greenish, thick, abundant discharge, or even some general disturbance, when all these symptoms are not carried to a disproportioned degree, leading to a fear of dangerous complications. Yet nothing so simplifies a blennorrhagia and disposes it to yield to specific means as one or two applications of leeches to the perineum at the beginning of the disease. There is a formal contraindication to the use of cubebs when the digestive tract, acutely injected and excited by the fact of a violent febrile reaction, is unable to bear safely large doses of a very irritant agent. If there are some local inflammatory symptoms, let them not form contraindications for the immediate use of cubebs; but let them become such when it would be dangerous to the system at large and the genital system in particular to allow the continuance of an excessive febrile orgasm; and when the latter is relieved, let cubebs be again used for the blennorrhagia.

Velpeau, who made many trials of cubebs in clap, preferred it to copaiba on account of the less acute gastro-intestinal disturbance that it causes; he regarded the effects as more certain and prompt.

A pharmacist, Dublanc, Junior, has extracted from cubebs an oleoresinous matter, which, in the sixth part by weight of cubebs, has the same properties in the treatment of blennorrhagias; 20, 30, 50 centigrammes three times a day have the same effects as the ordinary quantities of cubebs in powder. This preparation is much less disagreeable to take, and fatigues the gastric passages less.

The alcoholico-ethereal extract of cubebs obtained by Delpech is superior to the preceding ; it corresponds with ten times its weight of the cubebs, so that each capsule represents about 7½ grammes (gr. 115). With this remedy we have been enabled to raise the dose considerably, and to obtain much more marked effects. We usually give, at the beginning of the disease, eight capsules a day—two in the morning, two before break-

fast, two before dinner, and two at bedtime. We prefer this mode of administration, because cubebs is very well borne when given just before the meal. Patients take it without repugnance, they have no derangement of digestion, no diarrhœa, though sometimes they reject some food when high doses are taken, the daily amount being from 45 to 60 grammes of cubebs (3 xi.—xv.). The discharge loses its inflammatory character; the pain, redness, swelling of the canal and the amount of the discharge speedily grow less. For nearly twenty years we have constantly used this treatment, and we have no reason to regret it. It rarely needs to be prolonged beyond twelve or fourteen days. There remains then nothing but a slight mucous discharge, curable by injections of sulphate of zinc.

Simple urethritis of women.—Acute irritation of the mucous membrane of the urethral canal in women is very common and very trifling, but gives much anxiety. Rather common in young girls, and more frequent in married women, it is characterized by a frequent desire for urination, with acute stinging during the passage, and vesical tenesmus which lasts some minutes after. We have seen those who had to go to the water-closet ten or fifteen times in an hour. This disease is sometimes epidemic in young girls' boarding-schools, and in this case common thrush is often observed. For more than twenty years we have used cubebs in this affection, and we find that large doses are not required. We formerly gave the powder in the dose of 2 to 4 grammes, twice a day, at meals; but now we give by preference the saccharate of cubebs mixed with water at the moment of using it, in the dose of one or two teaspoonfuls before eating.

Affections of the prostate and neck of the bladder.—Caudmont speaks very highly of the association of cubebs and copaiba in neuralgia of the neck of the bladder, whether due to the passage of instruments or to excess in drink.

Diphtheria.—M. Trideau d'Andonillé (Mayenne), comparing the diphtheritic affections with the catarrhal, and judging by the good effects obtained by the balsamic substances in the latter affections, used capaiba first, and then cubebs-powder, in a fearful epidemic of diphtheria in the department of Mayenne, and obtained very numerous cures.

On the 4th October, 1865, Trideau informed us of his discovery. Struck with the good faith and simplicity of his story, we made a speedy trial of its virtues. By degrees the news spread, and in November, 1867, the remedy was used in the children's hospitals. In March, 1868, Bergeron communicated to the Société Médicale des Hôpitaux the favorable results which he had obtained at the Sainte-Eugénie, which agreed with those which Archambault obtained at the Children's Hospital.

So nauseous a remedy must have had a real value, or it would not have been given to children.

One of us, who succeeded Bergeron at the Sainte-Eugénie in April, 1868, employed the skill of Delpech to overcome this difficulty. Using the property of fixing the resin which sugar possesses, he made a sac-

charure of cubebs, containing a tenth of its weight of the extract, prepared by the method of Dausse. This preparation, which thus corresponds weight for weight with cubebs, is in the form of a greenish white powder, possessing a weak ethereal odor and a sugary taste, which masks that of cubebs. The powder dissolves easily in water, forming a sort of sugary and ethereal emulsion which children swallow very readily. We have given three or four teaspoonfuls a day. In this dose it is very well borne; but if more is given, five or six spoonfuls for example, it causes diarrhœa pretty surely.

In the above dose of 10 grammes the saccharure is perfectly well borne, and soon moderates the production of plastic secretions from the throat. In croupous angina the saccharure, aided by douches of lime-water, is very sufficient to cure, and we use no other treatment. In croup, even of the toxic form, it has sometimes had unexpected success (Société de Thérapeutique, mai, 1868).

On resuming his service, Bergeron found the use of the saccharure established in the wards, and adopted it; the same was the case in the Children's Hospital.

In the observations made by the pupils of Bergeron, MM. Saison, Varlin, and Moreau ("Thèse de Paris," 1870), though it does not constitute a specific of the value of cinchona, nevertheless does real service, and is the most efficient remedy for this terrible disease.

Coffee.

Headache.—Common experience has devoted the use of coffee to headache, especially such as comes after eating, in nervous persons, and perhaps still better in sanguine persons. Slight migraines almost always yield to it. Rationalist physicians would establish many and capital distinctions, but domestic empiricism does better than the severest science, and coffee is able to cure almost all headaches, at least such as are idiopathic, and not the prelude or the symptom of a fever, an acute disease, etc.

Cerebral congestion.—The power possessed by coffee to awake the brain and the senses, to drive off sleep, to give activity to all the cerebral functions concerned in the manifestation of thought, has doubtless given rise to the idea of combating by its aid the stupor, the spontaneous narcotism, the apoplectiform affections, and analogically, the same symptoms, if artificially produced by the stupefying substances, especially opium.

Willis, in his work called "Diatriba de medicamentorum operationibus," classes coffee with *antihypnotics;* "liquor coffææ ad narcosim pellendam summe efficax."

Since then it has always been prescribed in soporous diseases, hebetude of the senses, tendency to apoplexy, even hæmorrhagic, in persons of a certain age, of a soft habit, of a full complexion, in somnolent old

men who are dull and voracious, whose memory is growing weak, etc. The nervous state which coffee develops is opposed to this diathesis and to all these conditions.

It was but a step from this to using coffee in the narcotism of opium and all the stupefying preparations; and the analogy is not deceitful, for if coffee does not chemically neutralize these agents, at least it prevents their stupefying power, and perhaps may sometimes arrest all the symptoms of poisoning by its own power. Every one knows its power of dissipating the fumes of wine, and delaying or moderating drunkenness. Orfila has shown that it is without effect against hydrocyanic acid.

Intestinal affections.—In the persons described above, coffee hastens digestion, and if we believe the natural inductions from analogy and reasoning, and very numerous testimony besides, this delicious drink is able to lessen the organic renovation.

Junker mentions a circumstance which fortifies our own testimony. He says: "Certior ad huc valetudinis offensa puellis imminet, quæ pulverem decoctarum fabarum cupide vorant ad pallorem faciei, scilicet venustiorem sibi gignendum. Hic sane, si inde reportetur, deformior erit naturali rubore et vecordiæ juxta ac læsæ sanitatis argumentum."

This important fact, and what we have said of nervous persons, and especially women in cities, to whom coffee gives dyspepsia, spasmodic mobility ("the whites" are a very common accompaniment of this state of the system), would be a reason for believing in the statement (made by several authors) that it is very liable to cause leucorrhœa. This effect is especially attributed to café au lait, and it would certainly seem less likely to produce the effect than a pure aqueous infusion. Our trials prove that coffee is diuretic, which many others noted before us; it has therefore been ordered for the gravel: "Urinam movendo, sabulum et calculos minores pellit" (Murray).

Intestinal strangulation.—The property which coffee possesses of causing intestinal contractions has been put to use for aiding the reduction of strangulated hernia, and the effect has been such that in certain cases hernias which taxis could not reduce, and which were about to be operated upon, were reduced spontaneously (Pautrier: *Bulletin de thérapeutique*, 1860, t. II., p. 468; Lamare Picquot, ibid., 1861, t. II., p. 28; Cellarier, ibid., 1861, t. II., p. 270; Guyot, ibid., 1867, t. I., p. 36; Bouillon, ibid., p. 82). The remedy is so inoffensive that it ought to be used before kelotomy is decided upon.

Adynamia.—Martin-Solon has used coffee with success in the adynamic form of typhoid fevers. The excitants of the circulation seem to us the best indicated in this case, and experience has also given them the preference. But we have sometimes found coffee of incontestable value in these circumstances.

We have made a very valuable application of coffee in that period of cholera which we will call the period of typhoid reaction, or of hot asphyxia. The patient falls into a soporous state with inertia of the cap-

illary circulation, in which the infusion of coffee has been successful, in spite of a fever which is sometimes quite active.

Intermittent fevers.—Many observations attest the efficacy of coffee in the treatment of intermittent fevers. Among eighty patients affected with intermittent fevers, treated by Dr. Grindel, of the University of Dorpat in Russia, with coffee (sometimes roasted and infused, 1 ounce to 576 grammes of water boiled to 190 (℥ vi.), sometimes in powder, 1½ gramme in the apyrexia), all recovered very well, except eight. The inhabitants of the Morea, according to Pouqueville, infallibly cut short their intermittent fevers with a mixture of coffee and lemon-juice. Murray noted this mode of administration. Constance, James Thomson, and many others have found coffee of equal value in this case.

Asthma.—One of the remedies for which coffee has been used and still is familiarly used with great success every day, is periodical nervous asthma. Musgrave and Robert Brie speak thus, and Pringle and Percival. Floyer, the author of a good treatise on asthma, who had himself suffered from it fifty years, was successful in relieving himself by this remedy. Laennec also recommended it, and asthmatic old men well know its use in relieving their anguish. It must in these cases be taken in large doses, and very concentrated.

Whooping-cough.—Dr. Jules Guyot has greatly praised coffee in whooping-cough. He gave it after each meal in the dose of a teaspoonful up to two years, a dessertspoonful to four years, and a tablespoonful beyond that age. The most obstinate and marked cases yield, he says, in from two to four days at most. In our own hands coffee has proved a feeble aid in whooping-cough, but we do not think it without some efficacy. The infusion of raw coffee has been chiefly used in these cases.

The anticalculous properties attributed to coffee, of which we have spoken, may be based on the remark that gravel is almost unknown in the East and the Antilles, where the bean of Yemen is so enormously consumed. The same observation is applicable to gout.

The contraindications of coffee are easily understood after what we have said. Vaporous women and hypochondriacs ought to abstain strictly from its use. Pomme and Tissot have strongly protested against its use by such persons. The celebrated Juncker, in his "Conspectus therapiæ generalis," insists on this point: "Hypochondriacos et ita fæminas otiosas in angores quosdam internos, palpitationem cordis et vel tremorem artuum conjicit."

Coffee, like tea, has the power of sustaining, and producing for a time the effect of aliment. In certain professions, as that of the miner, it plays an important part. The miner who performs such severe labor supports his strength in great part by coffee. It seems that this drink fixes the state of the nutrition, and retards the movement of decomposition, for it does not nourish directly. This property is connected with that which we recognized in regard to the visceral nervous system.

The power of moderating denutrition led Schulz to call it "an econo-

mizer of waste," in 1831. Bœcker followed in 1849, and in the next year the theory of arresters of waste reached France.

In a note communicated to the Académie des Sciences, April 8, 1850, upon the alimentary regimen of the Belgian miners, M. de Gasparin observed that the laborers of Anzin could not keep up with the Belgian miners in their daily work, though they were much more fully fed, and that they had had to give up labor in the mines of Charleroi. The diet of the French workmen contained from 20 to 26 grammes (3 v.—viss.) of nitrogen, while that of the miners of Charleroi contained less that 15 ($2\frac{3}{4}$ drachms).

The food of the miners of Charleroi was as follows:

The Belgian workman took every morning half a litre (1 pint) of coffee and a piece of bread and butter.

During the day he drank a quart of coffee with slices of bread; and in the evening, potatoes, cabbage, bread, and coffee. The daily total was:

Coffee	30	grammes for 2 litres ($\frac{3}{3}$ i.).
Milk	$\frac{2}{10}$	of a litre or quart.
Bread	1	kilogramme (about 2 lbs. 2 oz.).
Butter	60	grammes ($\frac{3}{3}$ ii.).
Green vegetables	750	" (about $1\frac{1}{2}$ lb.).
Meat	73	" (500 per week)=1,085 gr., 7,500 gr.
Beer	286	c. centimetres (2 litres a week=2 quarts large).

The amount of nitrogen in this diet was estimated at:

Coffee	0·222
Chiccory	0·176
Milk	0·114
Bread	12·500
Butter	0·004
Green vegetables	0·037
Meat	1·767
	14·820

M. de Gasparin added:

"To coffee alone can we ascribe the power of satisfying themselves with a diet which children would not bear; and its action is not that of a nutritive substance, for the analysis shows that it does not compose more than a thirty-fifth of the nutritive properties of the food. Coffee has therefore other properties, which are very important.

"Does it aid the digestive functions? Does it produce a more complete assimilation? or does it perhaps retard the nutrition of the organs, which then do not require so great a consumption of materials for repair or maintenance? In this case coffee does not nourish, but prevents denutrition."

We readily accept this theory (see Marvand's book, "Les éléments d'épargne," 2d edition, 1874), but let us not forget, if we choose to consider coffee an agent of economy, to place ourselves in the same conditions. The coffee in question is prepared by boiling, that is, by extracting as much caffeine as possible, and the volatile excitant principle, caffeone, is mostly lost. We know well that if an infusion is made in a closed vessel, and taken in the evening after dinner, the excitation of coffee is easily produced, and with it comes insomnia, so that next day the consumer is fatigued and has not at all increased his power.

If the same infusion is taken after breakfast, it is less likely to cause insomnia, but will deprive of sleep those who have not acquired the necessary tolerance by habit.

Coffee taken in the morning is less exciting, sustains the strength, enables one to wait for the second meal (breakfast at one), though it be delayed, and does not deprive of sleep. This action is chiefly obtained with coffee prepared by boiling and not by infusion.

There is a decided difference between coffee prepared as the French do it at present and boiled in the Oriental way. By the infusion in a closed vessel we obtain principally the caffeone, and only a part of the caffeine. This coffee is excitant. That of the Orientals, which is made by boiling with free exposure to the air, lets the essential oils escape and takes from the berry a larger portion of caffeine. Thus, when we desire that coffee shall sustain the strength without exciting to expenditure, it must be prepared in this second way, taking care to boil it with sugar.

It seems needless to fix the doses and modes of administration. We wish that medicine would make more frequent use of this active remedy, and that physicians would employ it, especially for patients who are not accustomed to it in health; but such will soon be rare.

Hahnemann perhaps only exaggerated a little when he accused coffee of having assisted in the production of vaporous diseases, which have been more common within one or two centuries than before. Tissot and many others had already suspected this relationship.

Coffee has the very curious power of neutralizing the disagreeable taste of certain substances, such as Epsom salts, the salts of quinia, etc., but according to Quévenne, it is important to bring the infusion of coffee to a boil in contact with the substance of which the flavor is to be destroyed.

Caffeine, or the immediate principle of coffee, has also been found in tea (theine), and guarana or Paullinia sorbillis (guaranin) ; it was announced in 1819 by Runzi, described in 1821 by Pelletier and Robiquet, and studied by Pfaff, Liebig, Martins, Payen, Péligot, Stenhouse, Rochelder, Van den Corput, etc. It exists in coffee in combination with caffetannic acid (Rochelder), called also caffeic by Pfaff and chlorogenic by Payen. Caffeine is a very weak base.

Caffeine and its salts, in the dose of a few grains, produce a slight sleepiness, soon followed by an excitation which makes the energies of the vital functions active and aids intellectual labor. In a large dose it is emetic;

it seems to increase the biliary and urinary secretions. It has been recommended in migraines, neuralgias, and intermittent fevers.

Alcohols. Wines.

External Use of Alcohol.

1. *As an irritant.*—Its immediate effect is cooling, soon followed by a reaction, characterized by an increase of the peripheral circulation; it also becomes, by prolonged application, a local irritant, which may cause a superficial eschar.

This property has led to its use as a derivant, and to cure deep phlegmasiæ. Houzelot and Nélaton treated (*Journ. des conn. méd.-chir.*, 1861) synovial tumors of the wrist by applying over them eight or ten thicknesses of cloth soaked in alcohol at 36° and covered with oil-silk. Nélaton recommends the same method for curing serous bursæ of the palm of the hand.

Brodie and Ibre have thus treated hypertrophy of the mammæ (Deville, *Gazette des hôpitaux*, 1862). Alcohol has been used very long to treat chronic inflammations of the joints, and Béhier has lately seen a gouty patient who found no better means of relief than to rub himself briskly with a brush dipped in alcohol.

Becker cured by the same means three children with cephalhæmatoma (Hufeland, *Journal*, 1823), and Burns treated the affection by applying compresses wet with alcohol (Meissner: "Kinderkrankheiten").

2. *As an agent of spoliative treatment.*—Alcohol has been thus used for a long time for burns. Béhier quotes in support of this view the experience of Jean Valœus and Boyle; we will add that of Parkinson (*Samml., ausserl. Abhandl. f. pract. Aerzte*, 1800), and of Stokes, who prescribed it before suppuration was established (*London Med. Reposit.*, May, 1822). Lombard followed the same practice in a burn of the first degree caused by the explosion of cannon-powder ("Clinique des plaies d'armes à feu," Lyon, 1804, pp. 42, 43).

Erysipelas was likewise treated by Lanzoni (1683–1730), Harris, James, and Gouzée (*Archives de médecine*, avril, 1833). The latter covered the entire affected part and the forehead with compresses soaked in a cold fomentation composed of 60 grammes (℥ ii.) of whiskey at 15° B., mixed with a pint of water. A more valuable use of alcohol was taught by Nélaton. He showed that by keeping compresses well soaked with alcohol at 40° constantly applied, the development of furuncles can be prevented and inflammation stopped (*Gazette des hôpitaux*, 1853).

3. *As a topical remedy.*—Alcohol was formerly used as a dressing; it even remained a popular remedy, as is shown by two old preparations which remain in use in the pharmacies—the vulnerary, or vulnerary tincture, and the "eau d'arquebusade" or "eau vulnéraire spiritueuse." Surgeons used hardly anything but camphorated spirit of wine in contusions. In 1859, Batailhé and Guillet (Académie des Sciences, 16 août) proposed

to reject entirely the use of fatty bodies in the treatment of wounds, and to replace them with alcohol. They argued from its property of coagulating albumen, blood, articular synovia, the serum of the connective tissue and the serous membranes. They added that, in wounds inflicted on animals, alcohol stopped the bleeding from small vessels and gave activity to the secretion of plastic lymph. They concluded that alcohol facilitated union by first intention, and that, by coagulating the fluids, it opposed purulent infection and hospital gangrene.

Unfortunately the criterion of clinical experience was wanting; and the majority of surgeons showed little desire to follow the new path. But the alcohol dressing, recommended and tested by Nélaton, soon began to be common. The success of our eminent surgeon was published by Chédevergne, then interne at the Hôpital des Cliniques (*Bulletin de thérapeutique*, 1864, t. II.); soon after the thesis of Gaulejac appeared (1864), and the mémoire of Lecœur of Caen, in which he stated that for years, and especially since Batailhé's paper, he had hardly used any other dressing. The alcohol should be used pure in these cases. It forms, however, but one of the numerous resources which we possess, for the sulphites, creasote, phenic acid, occlusion by cotton, in a word, all the methods for preventing putrid fermentation, do the same thing. The dressing with alcohol is not so painful as one might have supposed *a priori;* they usually possess the advantages described by Batailhé, keeping the wound clean and odorless, and giving rise to no exuberant granulations.

There is no fear that the hopes of surgeons in regard to preservation from purulent infection will be deceived, but observation must be carried further before we can make a positive affirmation.

Alcohol has been injected into serous cavities, by Jobert (de Lamballe) into the peritoneum, and by Dupieris into the tunica vaginalis. This treatment consists in injecting into the tunica vaginalis (after the liquid has been evacuated) 5 grammes (75 minims) of pure alcohol. A. Richard, who used this treatment for fourteen patients, found the inflammation much less intense than might have been feared, for thirteen rose and went about their business directly afterward.

Brown recommended injections of alcohol in blennorrhagia. He took it as concentrated as possible, and diluted it with 6 or 8 parts of water ("Med. Comment. of a Med. Society of Edinburgh," transl. by Diel, t. II., 1791).

Gosselin has also cured a purulent blennorrhagic conjunctivitis by injections of alcohol, 1 part to 3 of water (*Gazette des hôpitaux*, 1865).

Internal Use of Alcohol.

Adynamia.—Loss or depression of power has always been a serious indication for stimulants; in our time the indication is generally followed, and that which we shall say of the larger doses in acute disease is not at all opposed to it.

Febrile diseases.—If we consider that the febrile disease is chiefly marked by elevation of temperature, that is, a much more active combustion, and consequently a continued spoliation of force, it is reasonable to admit that all remedies which can sustain the patient, either by furnishing the materials for this combustion, or by moderating the function of calorification, will enable him to resist much longer.

Whatever be the explanation, there has for some time existed in England a method called Todd's, consisting in the administration of large doses of alcohol to patients in fever.

According to Anstie (quoted by Béhier), "Alcohols given in small repeated doses, produces the following effects : the pulse regains power, without becoming rapid, unless it was previously of abnormal slowness. The temperature of the skin becomes natural, without flushing of the face. The activity of the brain increases ; the sense of fatigue and the tendency to convulsions diminish. All these symptoms show that the brain, the medulla, and the ganglia of the great sympathetic have been stimulated, and that their circulation has been made active. These effects cease after a certain time, and leave the system in the condition in which it was before the administration of the doses, except that when there was previously a morbid depression, the latter is lessened" (Béhier, loc. cit.).

It is generally admitted in England, and some persons in France believe it, that alcohol is not an aliment, and that its only effect is to lessen the expenditure. This formula is, perhaps, untrue, but we must make a fundamental distinction between the physiological and the therapeutical action.

From the physiological point of view, it is said that alcohol is not a food because a part of it is recovered in its original form in the excrements, and another part remains in our organs. This is not proof sufficient, and would only become such if the entire quantity of alcohol were recovered without transformation. We would add that it is said that the products of transformation of alcohol have not been found in the system. Perrin, however, has found a certain quantity of abnormal fat in the blood, and it is proper to ask if this fat is not a product of the transformation of alcohol.

The problem, then, is not solved ; but it is evident that we may not say (as we hear said daily) that alcohol reduces the organic expenditure without reducing the labor produced, and that, consequently, a man who has taken a nip in the morning expends less force in his work. This way of stating the equation of labor is contrary to the theory of equivalence of force. A man cannot furnish force without expending force ; and if alcohol allows him to expend less, it is because alcohol is a food and itself furnishes this force, otherwise this reduction of expense is a chimera.

In pathology, that is to say, in therapeutics, the case is quite different ; a substance may prevent a person in a fever from losing force in

two ways at once, either by serving as a heat-producing food or by diminishing the calorification.

At all events, alcohol was and remains an excellent treatment for adynamia; but it is a new fact, with which Béhier has made us acquainted, that the English use alcohol in large doses in the active forms of febrile diseases, and that the remedy is remarkably well borne. Gingeot (Thèse, 1867) gave to children of fourteen years as much as half a pint of alcohol, and to children of two or two and a half, 80 grammes (℥ xx.) of the same liquid, without producing intoxication.

Acute bronchitis.—The theory of Brown taught that all diseases, particularly the acute, produced asthenia directly or secondarily. The English, faithful to this school, gave to their patients wine and alcoholic drinks. In France, on the contrary, the theory of Broussais always led to distrust of irritation, and condemned the patient to chicken-broth or gum-water.

Broussais, however, encountered resistance, and Laennec was one of his opponents, who had retained a popular method which he found valuable. He gave hot wine, burnt brandy, punch, and regarded this treatment as heroic in a great many cases. A cold which seemed about to become very severe often passed off in a night under the influence of 30—45 grammes (℥ i.—iss.) of brandy given in an infusion of violet. But if the patient presented himself at a more advanced stage, when the catarrh was established, the treatment no longer had the same effect ("Traité de l'Auscultation," 4e éd., 1837).

We have constantly used this remedy, and have found it as useful for adults as for children. For the latter, we will add other testimony.

In the capillary bronchitis of children, Rilliet and Barthez recommend the cordial wines, in the asphyxiated form when the child is greatly oppressed, and has not strength to cough or vomit. They advise Port, Madeira, Malaga, Marsala, Lunel, etc. ("Traité clinique des maladies des enfants," t. I., p. 495). Blachez recommends the same in the capillary bronchitis of old men (Art. "Bronchite Capillaire," in the "Dictionnaire Encyclopédique").

Pneumonia.—Franck, Laennec, Chomel, and most of the French masters, have long recommended wine and the alcoholics in pneumonia, when it takes the adynamic character. They often added food to quiet the delirium, which the ancients called "delirium ab inedia." But they would never have dared to prescribe alcohol in large doses for the frankly inflammatory form in sanguine, young, and vigorous subjects, more particularly in children. The method of Todd showed that in these very cases alcohol could moderate the fever and the pulmonary lesion plainly, instead of producing that incendiary action which would have been dreaded by every one, even by those who avoid the errors of Broussais.

Thus it is not only in adynamia and ataxia that Todd recommended alcohol, but also in the most inflammatory form with intense fever. Here is the original reform formulated by Todd and introduced into France by

Professor Béhier. The first successes of Béhier were soon recognized and proclaimed by the French physicians. The new experiments showed again that alcohol is a precious remedy in the adynamic form, and for patients weakened by a previous disease or by the habit of drinking. It succeeds remarkably in the ataxic form which accompanies certain pneumonias of the summit, and so often produces collapse, carrying the patient off in two or three days. Alcohol is also indicated in spite of the intensity of the heat and the frequency of the pulse; in such case it soon moderates the fever and the pneumonia. This treatment is applicable in all points to children, who in such cases bear alcohol surprisingly well.

For old men, in whom pneumonia is so often associated with weakness, alcohol truly deserves the name of "lac senum."

Erysipelas.—Todd says that there is no disease in which the effects of alcohol are more evident. It seems, says he, that alcohol is a direct antidote to the erysipelatous poison. Béhier, without being so positive, admits that alcohol is a good remedy to stop delirium, and that he has seen it successful where opium had failed. In the eruptive fevers, variolæ, measles, scarlatina, the action of alcohol was not so marked, nor in articular rheumatism. We find it hard to accept the results of Marvand, who says he has cured with alcohol six cases of primary hæmorrhagic small-pox, and thirty-nine cases of secondary hæmorrhagic small-pox. We are also obliged to make reserves in regard to cases of articular rheumatism with delirium, cured in from four to ten days.

Infectious diseases.—(Typhus, typhoid, puerperal fever, traumatic fever, purulent infection.) Alcohol has received praise in all these affections; but it is plain that a part is due to novelty and enthusiasm. We cannot rely on alcohol to cure purulent infection and primary puerperal fever.

Carmichael, Smith, Graves, Corrigan, Lyons, Murchison, recommend alcohol in the adynamic symptoms of typhus, especially if the disease appears in an old man or a drunkard, if the pulse is soft and depressible, whether fast or slow. The indication will be still more formal when the first doses diminish the frequency of the pulse and give it new force. But if the pulse increases in frequency, or the delirium continues, alcohol must be stopped. In typhoid fever, Chomel, Monneret, Stokes, Béhier, and we, have long recommended alcoholic drinks for the adynamic form, especially in that form of delirium of which we spoke above, which we regard as a real delirium of inanition, and which usually comes from the tenth to the fifteenth day.

Convalescence.—The indication for alcoholic drinks in convalescence has always been admitted, and in all countries. Every one knows the precious influence of old and generous wines; they have never had a better use than that of quickly restoring to health a friend or parent. But in such cases we no longer give alcohol *per se*, but alcoholic wines, marking 10° to 15°. We give small quantities after food, in order not to irritate the stomach. Wine, which saves expenditure, is then a reparative food.

The treatment of alcohol is quite often applicable to caseous or tuberculous pneumonia, to that rapid inflammatory tuberculization which may at its outset be confounded with certain non-chronic and non-tuberculous pneumonias. Especially when the tuberculous phlegmasia becomes generalized, and emetics and antimonials have been sufficiently used, we may find Todd's draught very useful. We have found it so, and consider the method as destined in France to render more service in inflammatory and rapid phthisis than in frank and sane pneumonia. This is also the best treatment in the colliquative fever, in the third stage of phthisis. There is a suitable food which the patients like, which sustains and quiets them, consisting of a *lait de poule*, or ice cream fortified with rum or cognac. In these cases raw meat is also given (Pidoux: "Études générales et pratiques sur la phthisie," 2e édit., p. 415).

Vomiting.—Lanzoni used alcohol with success to check the vomiting of pregnant women, and we very often find such persons using the prescription. Instinct is here, perhaps, a good source of indication.

The treatment has been tried for some time in tuberculous cases (Tripier: *Bulletin de thérapeutique*, 1864).

Hœmorrhage.—It is customary in England to give wine and alcohol to pregnant women who have hæmorrhage per inertiam after delivery; the common people do the same among us. Physicians have prescribed it for some time (Campbell: *Journal des connaissances méd.-chir.*, 1861; Max. Legrand and Michaud: *Union méd.*, 1860; Béhier, Pajot, Charrier: *Bulletin de thérapeutique*, 1859).

Faure has likewise cured a woman suffering from very grave hæmorrhagic purpura, by keeping her for some time in a state of intoxication.

Asystolia.—When the heart is weakened temporarily or permanently, when its fibres are atrophied and in a state of fatty atrophy, alcohol reanimates its functions for a moment. The heavy wines and spirituous drinks are among the cordials. The dose in these cases is small.

Intermittent fevers.—Recommended first by Lanzoni and Albrecht, alcohol has been again praised by Guyot and Burdel (*Union médicale*, 1860 and 1862), and has been of very special use in two cases in which it was given by Hérard (*Gazette des hôpitaux*, 1861).

Algidity.—The stimulant properties of alcohol have led to its very frequent use in cholera, the bites of poisonous animals, and poisoning by arsenic. We need only name the diseases of delirium tremens, scrofula, colics, etc.

Phosphorus.

Dujardin-Beaumetz has found phosphorus useful to four ataxic patients. In three, there was a temporary improvement, increased ease in walking, less marked inco-ordination, and the patients could ascend and descend stairs. But fresh observations have not confirmed these hopes. One of us has found erections renewed in an ataxic person by this remedy.

In other patients affected with alcoholic tremor and attended by Guéneau de Mussy, phosphorus has also seemed to be of use, but there is no decisive case.

Phosphorus is a dangerous remedy, as it may cause mortal changes, without any premonition; and though Delpech and Ferrand gave phosphorus several months without causing bad symptoms, the dose of 10 milligrammes (gr. 0·15) should never be exceeded, and it should be suspended from time to time.

Delpach thinks highly of phosphorus in hemiplegia of cerebral origin, after the inflammatory process has ceased. He cured old paralyses by this remedy, used perseveringly; and has relieved, with promptness, the troubles produced by sulphide of carbon in workmen employed in vulcanizing caoutchouc.

Phosphorus has also been used with success in goitre by Bradley of Manchester, and by Leech in cervical adenopathy (*Bulletin de thérapeutique*, 1874, I., 235).

Dr. Vigier has seen phosphide of zinc put an end to metrorrhagia, and sometimes improve chlorosis.

Workmen who make chemical matches are very subject to diseases, among which is the necrosis of the jaw, a frequent and often a fatal malady.

Hypophosphite of Sodium (NaO, 2 HO, PO).

Phosphorus is found in considerable abundance in the system; the bones contain 90 per cent. of phosphate of lime, and phosphorus exists also in albumin, casein, and other albuminoid substances, in the brain-matter, fishes' milt, etc.

In 1857 Dr. Churchill read a mémoire to the Académie de Médecine, in which he sought to prove that the diminution of phosphorus in the oxidizable state in the system was an essential cause of the tuberculous diathesis; hence the application of the hypophosphites, especially of those of sodium and lime, to the treatment of pulmonary phthisis.

The hypophosphites contain in equal weights twice the amount that is found in the phosphites and phosphates; all are greedy of oxygen, and dissolve in water and alcohol; hypophosphite of sodium is the most stable, and has been preferred.

When lime is boiled with phosphorus in water, phosphorated hydrogen is disengaged, and hypophosphite of lime is obtained; if the excess of lime is saturated with a current of carbonic acid, after ebullition and filtration, hypophosphite of lime is obtained by careful evaporation of the liquid.

Hypophosphites of potassium and sodium are obtained by double decomposition, that is, by treating a solution of hypophosphite of lime by one of carbonate of potassium or sodium.

Churchill has proposed to use the hypophosphites in the dose of 50

centigrammes to 3 grammes (gr. 7½—gr. 45) for the tuberculous diathesis, and in smaller doses as a prophylactic; it is given in draughts.

Unfortunately, the facts published by Dechambre, Vigla, Riéken, and Flochner, by no means confirm the statements of Churchill, and in spite of the favorable case published by Parigot, the cause of the hypophosphites seems to us finally decided in the opposite way to that maintained by Churchill.

Oxygen.

Asphyxia.—As soon as oxygen was discovered, it was applied to the relief of asphyxia; but at that time, as often now, suffocation was confounded with strangulation, hanging, and submersion in water or in poisonous gases. Goodwin, of Edinburgh, in 1786, while studying death by submersion, thought that death occurred by asphyxia, and invented an aspirating and forcing pump for withdrawing the foam from the bronchi and insufflating oxygen gas. Three years later, in 1789, Gorey, of New Breisach, invented a pump intended for the same purpose; there was soon a mania for it, and a series of instruments were invented for the same purpose called "pompes apodopniques." Van Marum of Haarlem made one in 1783, and also Hens Courtois; but the confusion of suffocation with strangulation, submersion, etc., interfered with success, and prevented oxygen from always restoring to life. For this reason, and for others, oxygen ceased to be used in asphyxia, and has not been resumed in our time.

Demarquay, probably because he was a surgeon, was rarely called upon to treat asphyxia, and has hardly spoken of the question in his "Traité de pneumatologie," except in a case where voluminous glands compressed the trachea and threatened suffocation.

If the imitators of Demarquay have not used oxygen in accidental suffocation, it is perhaps because the means of procuring it on the spot are not known. We have used it with success in a case of asphyxia from pulmonary and cervical congestion.

In another case, where the asphyxia was complicated with an apoplectic condition, oxygen was of still more signal service. The case was one of poisoning by opium. A lady of seventy-four years, feeble and slightly rheumatic, took by mistake a tablespoonful of Sydenham's laudanum, instead of a medicine-spoonful; this was soon noticed, and an emetic given. An hour after the accident we injected under the skin 5 milligrammes of sulphate of atropia and ordered black coffee. The symptoms of poison seemed to cease, but by degrees they made such progress that, ten hours after the accident, the patient was in a state of coma and was thought to be lost. The pulse was very rapid and hard to feel, and the respiration was only seven in the minute. At this point we caused her to inhale fifteen litres of oxygen; consciousness returned almost at once, and she knew the bystanders. From that moment she improved, and on the next morning was out of danger.

Demarquay found oxygen of value in the case of a woman who was suffocating with a tuberculous engorgement of the cervical glands, compressing the trachea. Under the influence of inhalations of oxygen, repeated daily, she was built up, and left the Maison de Santé considerably improved (loc. cit., p. 747).

These observations convince us that oxygen (which can now be procured always and everywhere) ought to be tried in cases of asphyxia by suffocation.

Though poisoning by the fumes of charcoal is, as shown by Claude Bernard, an intoxication by the oxide of carbon rather than asphyxia, and though the blood inpregnated with this gas hardly absorbs oxygen, yet it is natural to give oxygen in such a case, and we have done so to one patient, with good effect. Demarquay, Duroy, and Ozanam have had analogous success. They regard oxygen as the antidote for all asphyxias.

Asphyxia neonatorum.—Chaussier counted much on the aid of oxygen in this case; he invented several apparatus for the purpose, but never had occasion to apply them.

Accidents from anæsthesia by chloroform and ether.—Dr. Jackson, of Philadelphia, in 1847, used oxygen in asphyxia produced by ether. He was followed by Blanchet, Faivre, Gianetti, and Martin Saint-Ange, but especially by Duroy and Ozanam. Duroy first found that pure oxygen could be inspired without danger for whole hours; he then showed that oxygen, given with chloroform, retarded and enfeebled the anæsthetic action. Finally, having completely anæsthetized dogs with chloroform, aroused them quickly with inhalations of oxygen. But if oxygen can put an end to the state of anæsthesia, it does not follow that it can conjure the danger of chloroform. The danger of anæsthetics is usually syncope, and it is this syncope that oxygen ought to arrest, and not the anæsthesia, in order to conjure this danger. It is then to be feared that in cases of sudden death during the inhalation of chloroform oxygen can be of little use. Yet it is a resource which should not be neglected.

Asthma.—The attack of asthma is an affection very suitable for the use of oxygen. What more rational than to offer a purer and more vivifying air to the unhappy patient who inspires so little oxygen and becomes asphyxiated? At the very first, Beddoes used it with the greatest success; then Marching, Poulle of Montpellier in 1782, Stoll in 1774, Chaptal, and at last Thornton, partner of Beddoes, who gave it to a great many patients, and declared that the asthmatics were extremely relieved in the immense majority of cases.

Demarquay gave oxygen to three asthmatics. In one case the success was truly marvellous, and the patient felt the dyspnœa disappear as the balloon shrank, and the attack was over when the balloon was empty. In two other cases of humid asthma, that is, in emphysematous patients who had contracted suffocative catarrh, oxygen only brought partial relief.

Oxygen has been wonderfully successful in a similar case of ours. A young emphysematous woman was attacked every year in the middle of

the summer with asthma. This lady was pregnant, and was very much afraid that the attacks might return every year. We were called in all haste by night. She was in a pretty severe attack, which lasted one hour. We immediately had a supply of oxygen brought and made her inhale by degrees during half an hour about 30 litres (quarts). The effect was most remarkable. The respiration, which was forty, fell very quickly, and at the end of the inhalation was eighteen. The pulse, which was eighty, did not fall; but instead of being small and concealed it became strong and ample. An hour after the beginning of the treatment the patient slept profoundly.

On the morrow, and on the following days, there was still a little dyspnœa and oppression, and each time oxygen came to the rescue as at first; the respiration diminished in frequency and the pulse regained force.

The small experience which we have had of oxygen in asthma is very encouraging, and there are few remedies which give hope of such a speedy relief, except the bath of compressed air.

Bronchial dilatation.—We will compare bronchial dilatation with pulmonary emphysema, because the former, like the latter, is often only a pulmonary paralysis with atrophy, with the difference that bronchial dilatation affects the great aërial passages, while the other affects the pulmonary acini. There is only one observation of bronchial dilatation treated by inhalations of oxygen, due to Cosmao-Dumenez (Demarquay, loc. cit., p. 745). This observation is not very conclusive, as regards diagnosis; perhaps there was only a chronic bronchitis with abundant catarrh. In any case, the inhalation brought back the appetite and strength. The sputa, which at first were abundant and purulent, became rare and mucous.

Pulmonary phthisis.—This was the dream of all the early partisans of oxygen. They had "vital air;" it was almost the fountain of youth to them; phthisical patients were to be reborn as by enchantment. A great many physicians, especially Caillens, believed that a specific for phthisis had been found; Chaptal, though not convinced, admitted that the first effect was very seductive; the patient breathed it with pleasure and seemed to be reanimated and revived in proportion as the gas was absorbed, but improvement was not lasting, and a new relapse soon appeared. He did not, however, prescribe it; "In a second patient the effect was not happy; but it inspired the same gaiety, and in this respect the remedy is excellent, for in desperate cases it is a very precious thing to be able to strew flowers on the edge of our tomb and mask the horrors of that frightful passage."

Fourcroy makes the same remark; oxygen given to twenty phthisical persons produced a very marked comfortable sensation, relief of the leading symptoms, and at least a change, so manifest as to lead to the hope of a speedy cure. But all these symptoms were transient, and in two or three weeks of the treatment violent inflammatory symptoms occurred, the

progress of the affection was accelerated, and death hastened ("Pneumatologie," p. 597).

Dumas and Baumés, of Montpellier, made the same observations; confidence was lost, and Kurt, Sprengel, and Dumas dared only to propose oxygen for slow and atonic phthisis. Beddoes and Dumas added that dogs long exposed to the action of oxygen had inflammatory affections of the lung with ulceration and suppuration.

We are not surprised, therefore, to see that phthisis, the hope of the partisans of oxygen, left them discouraged, and led them to give up the pneumatic institutes, after expending great sums on them.

Oxygen has been resumed in our time, but with results not much more satisfactory. A patient observed by N. Monod had immediate relief; but the phthisis continued its fated course without check; and so in a patient of Cosmao-Dumenez.

The relief obtained by the last-named, and by Hervé and Lavaur, should be taken into very serious consideration, not forgetting that the case of Cosmao-Dumenez was one of scrofulous phthisis, that is, of a sort which proceeds by attacks of tuberculous pneumonia, in which by other means we can obtain the resolution of a certain number of successive attacks.

It is wrong to prescribe a remedy which may give present relief to desperate cases; but we ought to remember the wise advice of Priestley and Chapman, in regard to ulterior dangers.

Albuminuria.—Eckart observed the cessation of albuminuria under the influence of oxygen. We have a similar observation.

First, we should remark that the case was not one of ordinary Bright's disease. The patient is a lady of forty-eight years, previously affected with exophthalmic goitre; the goitre and the cardiac agitation had disappeared, but she was not cured, for the exophthalmus remained, and in place of the cardiac agitation there was a cerebral disturbance which made her susceptible and irascible in a degree which she was not aware of; the general health had not gained much with the disappearance of the cardiac and thyroid symptoms; the latter had been replaced by an albuminuria which was alarming on account of the quantity of albumin passed and the duration of the morbid trouble. Oxygen stopped the albuminuria in one month, brought back the appetite and strength for a time, but afterwards the albuminuria reappeared and carried off the patient.

These two observations, Eckart's and ours, are such as to lead us to try this remedy in Bright's disease.

Diabetes.—Demarquay found benefit from the inhalations in the case of a diabetic patient who became consumptive; the first improvement was so great that his family thought him cured. Bouchardat used them in two like cases with the same success (Léon de Lavaysse, p. 91), and Limousin found oxygen lessening the proportion of glucose and producing considerable improvement.

We have not given oxygen to diabetic patients, as has been incorrectly

stated; we shall not speak of our own experience. But we cannot admit that the experiments of Voit and Pettenkofer form a contraindication.

What follows from these researches? That diabetics absorb less oxygen than people in health, and give out more urea. This is surely no reason for not giving a diabetic person more oxygen than the external air supplies him with.

The figures of Voit and Pettenkofer are as follows:

In twenty-four hours.	Healthy man. Grammes.	Diabetic. Grammes.
Oxygen absorbed	708·9	572·2
Carbonic acid exhaled	911·5	659·3
Water excreted	828·0	611·3
Urea	37·2	49·8

Cachexiæ.—There is no cachexia which has not been attacked with oxygen; but in most cases the success has been small, except in chlorosis; but we do not believe that in this case balloons of oxygen will ever be as valuable as residence in the country and sea-baths.

Local applications.—Oxygen irritates wounds, and when the limbs are enveloped with the rubber sleeve which receives the gas, it is easy to see that the emanations from the wound, reacting on the sulphide of carbon in the caoutchouc, form a foul atmosphere, and that the sores inflame. This property has been used for its substitutive action upon atonic, scrofulous, syphilitic ulcers, etc. The most successful local application has been that of the treatment of gangrene by this gas.

Localized gangrene.—In his thesis on symmetrical gangrene of the extremities, Maurice Raynaud, having first discussed all the processes which terminate in gangrene, observes that one of the conditions of the lesion is the absence of oxygen. He does not urge the conclusion to its end, that is, to the application of oxygen to the gangrene. But Langier has done so, and has found (Académie des Sciences, avril, 1862) that the application relieves the pain. The swelling goes down, the œdema disappears, the gangrene limits itself, and the parts threatened exchange their livid color for a rose-color. Since this time, the same remedy has been successful in the hands of Debouges (*Bull. de thérap.*, 1863), and of Foncras (*Bull. de thérap.*, 1866).

Compressed Air.

Moist or catarrhal asthma.—Certain patients with susceptibility to catarrh contract bronchitis frequently, with or without attacks of asthma, the duration of which increases with the number. By degrees the secretion becomes more abundant and at last is continuous. This bronchitis is at length accompanied by paralysis of the bronchi and pulmonary alveoli, which leads to dilatation of the cavities and atrophy of the walls, that is

emphysema. When the atrophy is incomplete, and there is no organic malady, but only a catarrh, baths of compressed air have a very efficient action.

Successes of this order have been obtained by Bertin, Pravaz, Gent, Moutard-Martin, Canuet, Leval-Picquechef, Féréol, Franchet, Cintrat, and ourselves. In general the patient is relieved after the first bath, and the improvement soon becomes more rapid. The attacks become less frequent, and lose intensity and duration. The catarrh also diminishes, the expectoration becomes less abundant, the sputa less purulent, while the rest of the health improves. The first cure often suffices for a long time. When they wish a second air-cure, the result is often less decided, and in some persons it becomes exhausted (Société de Thérapeutique, 26 mars, 1873).

If the patient has reached the advanced period when emphysema is organic and forms a mere cardio-pulmonary aneurism with a sort of varicose state of the entire venous system, the bath of compressed air still gives comfort, but is very far from having the curative effect above indicated.

Chronic laryngitis.—Sandahl, of Stockholm, says that he cured 15 out of 21 patients affected with chronic laryngitis, and Bertin has cured or much improved his 11 patients ("Étude clinique de l'emploi et des effets du bain d'air comprimé," Montpellier, 1862). In all these cases the aphonia is hard to reach; when it is simply catarrhal, nothing is risked by treating it with baths of compressed air.

Whooping-cough.—Sandahl established the treatment of whooping-cough by baths of compressed air. From 1861 to 1864 he treated 69 children and cured 58, that is, 84 per cent., with an average duration of three weeks. The baths lessened the spasmodic attacks, increased the appetite, and enabled the children to resist. The same success was obtained at Paris by Féréol, Leval-Picquechef, Blos, Canuet, etc. (Société de Thérapeutique, 9 avril, 1873).

Anæmia.—A child having been placed in the bell for whooping-cough, the servant-girl, who sat with it and was affected with anæmia, was much improved by the treatment; which gave to Leval-Picquechef the idea of treating anæmia by this method. The result, as attested by Moutard-Martin, Féréol, and others, was excellent.

Deafness.—Hamel having descended in the diving-bell at Heath, near Dublin, in 1820, experienced certain phenomena (humming in the ear, uncomfortable sensations in the tympanum), and thought that this action might be used in certain cases of deafness. Pravaz cites six cases and Lange fifteen in which hearing was recovered by baths of compressed air. It is supposed that these were cases of catarrhal deafness with temporary obliteration of the Eustachian tube ("De l'application de l'air comprimé au traitement de la surdité catarrhale," Grenoble, 1866).

Nitrite of Amyl.

Angina pectoris.—Lauder Brunton, Haddon, Hilton Jones, cited by Amez-Droz, report cases of the relief of painful angina pectoris, or rather of painful neuralgias symptomatic of organic affections of the heart, which were decidedly relieved by nitrite of amyl. Amez-Droz obtained similar results.

We have tried it often in patients with organic affections of the heart, with asystole, and have relieved them frequently. We have also used it for a patient suffering from angina pectoris produced by the abuse of tobacco, but our experience is not yet sufficient for us to be able to pronounce.

Hysteria.—We have often tried to arrest the convulsive attacks of hysteria by nitrite of amyl, but have not succeeded. We have often, however, put an end to the coma which succeeds such convulsions, restoring color to the face, and bringing back consciousness. For hysterical persons with spasms and vapors, nitrite of amyl has often taken the place of the ammonia-bottle.

Mal de théâtre.—All physicians who attend at theatres have observed the disease we describe, and which we have very often had to treat at the Théâtre Français, or even at the Opéra.

About nine or half-past nine o'clock, during the second act, the physician is called in haste to a spectator, male or female, who has just lost consciousness. He finds a syncope, with all the characteristic symptoms. The patient is stretched on a sofa, fresh air is admitted to his face, and he soon recovers. But he must not be allowed to sit up before all is over. If he tries to raise his head, lipothymy, or even syncope, reappears. In ten or fifteen minutes the trouble is at an end, and only a little weakness remains.

The cause of this trouble is always the same. The patients are almost always persons who have dined rapidly, often country folks who have dined at the restaurant, and have come directly to expose themselves to an atmosphere at a temperature often of twenty-five degrees or twenty-nine degrees (77°, 84° F.), with a great reduction in the amount of oxygen.

As to its nature, the affection is evidently due to cerebral anæmia. Nitrite of amyl is fully indicated.

SUDORIFICS.

Jaborandi.

We are much less certain of the therapeutic value of jaborandi than of its physiological properties. Therapeutical experiments, unfortunately, take much more time than physiological. We will state the results as at present known:

The abundance of the secretions, and especially of the excretions, produced by jaborandi, led to its use as a derivative. This singular remedy has seemed most favorable in cases of humid asthma, that is, acute bronchitis contracted by the emphysematous, bronchitis accompanied by abundant catarrh, intense congestion, and sometimes even pulmonary œdema. Gubler quotes several cases of attacks of asthma which were relieved by the first administration of jaborandi.

In influenza, as in acute bronchitis, the improvement has been equally rapid and decisive, but in bronchorrhœa the relief produced has been only transient.

In acute dropsy, in acute pleurisy, jaborandi has seemed to be serviceable (Créquy: Soc. de Thérapeutique, 10 mars, 1875). The same has been the case in Bright's disease, acute articular rheumatism, and muscular rheumatism; jaborandi has produced palliation, but only for a time. Maillart of Dijon has been more successful in a case of articular gout retroceding to the lung, in which the action of jaborandi terminated the attack.

Pneumonia has not been essentially improved; the treatment by excessive sweating has exposed the patient to certain complications. In one case the patient, drenched in sweat, took cold, producing a capillary bronchitis which, fortunately, did not prove fatal.

It is necessary to wait before deciding upon the therapeutic value of this prompt and energetic agent.

DIURETICS.

Nitrate of Potassium.

Almost all the therapeutic properties of this salt are inferrible from its physiological action. It is chiefly used as a diuretic and sedative.

Nitre is popularly used in all dropsies to increase the urinary secretion, the most powerful of the eliminative secretions. But if we may readily admit that nitrate of potassium is capable of rendering real service in moderate cases of serous engorgement, it is almost useless when the engorgement is not almost exclusively serous, and is harmful when the dropsy depends on a chronic affection of the kidneys, which is quite commonly the case.

The sedative effect of nitre has been specially used by Macbride, Brocklesby, and later by Gendrin, in inflammatory fevers, especially that connected with acute articular rheumatism. The numerous cases which Gendrin has published in conjunction with Aran in the February number of the *Journal des connaissances médico-chirurgicales*, 1841, show beyond a doubt the hyposthenisant effect of nitrate of potassium, and its utility in acute and febrile articular rheumatism.

Is it the same in inflammatory fevers connected with phlegmasia of the liver, lungs, etc. ? We shall not try to solve the question, but we incline to think that nitre is useful in these circumstances, basing our opinion first upon various scattered facts recorded, and especially on that curious observation of Beecher's which proves the diminution of fibrine in the blood of those who, in inflammatory fever, take large doses of nitrate of potassium.

It is in virtue of this sedative action that nitre enjoyed in the last century an antihæmorrhagic reputation, under the sanction of Stahl and Dickson, which, in our time, Laennec confirmed by his own experience; but, while it is incontestably useful in active hæmorrhage, it is evidently harmful in the passive form.

Chlorate of Potassium.

Gangrene of the mouth.—Hunt, in 1847, was the first to propose this salt for gangrene of the mouth. He used it in the dose of 1 or 2 grammes,

and from the second or third day he observed the good effects. West, and more recently Babington, confirmed these happy results; perhaps in true gangrene of the mouth, but perhaps in ulcero-membranous stomatitis, which they may have confounded with gangrene. The facts observed at Paris, at the Children's Hospital, while entirely in favor of the remedy, are not yet sufficiently numerous or decisive to enable us to state exactly the indication and the mode of action in true gangrenous stomatitis.

Mercurial stomatitis.—The case is different in the mercurial affection, which may be openly declared the real triumph of chlorate of potassium.

Doubtless guided by the labors of Hunt and Chanal, Herpin, of Geneva, perceived the great advantage which might be derived from this salt in mercurial salivation. The success surpassed all expectations. In fact, given in the dose of 2—4 grammes (ʒ ss.—i.) per diem, it is almost always successful, especially if the affection is attacked at a very early date, and if the treatment has been seconded by attention and cleanliness. The remedy must be continued three or four days together, especially if the salivation is not very recent and the buccal inflammation is of a certain intensity. One of the first signs of improvement consists in the return of the normal color of the gums, and the disappearance of that livid color which characterizes the beginning of mercurial stomatitis. Almost at the same time we observe a diminution of pain, of tumefaction of the gums, and of the salivary flow; and the teeth soon become clean.

The good results stated by Herpin have been verified from all quarters; at present, the most numerous and decisive trials give us ground for considering chlorate of potassium, internally used, as perhaps not a specific, but at least the most generally efficient remedy in mercurial stomatitis.

Instead of using it internally, Lasègue gave it in mercurial stomatitis in the form of gargles and concentrated washes, warming the water to thirty or forty degrees (86°—104° F.), for the salt is very slightly soluble in cold water. By these topical applications very marked advantages have been obtained, both in mercurial stomatitis and in some scorbutic affections of the gums. The surest way would be to use both methods at once.

Ricord has used the salt, not only to cure mercurial stomatitis when existing, but also to prevent its development during the use of the mercurials, and he has shown by numerous facts that by means of this precaution we often keep in check an apparently imminent salivation.

Ulcero-membranous stomatitis.—West first clearly formulated the internal use of chlorate of potash for this disease, which appears as ulcerations covered with pseudo-membranous patches, seated on the gums or the cheeks. The refractory character of the affection is also known; it often lasts several months, and is very liable to relapse.

Blache, repeating the experiments of West, has treated children comparatively by cauterization with fuming muriatic acid or dry chloride of lime, and by chlorate of potassium on the other hand. In the first set, the medium duration of treatment was twenty days, while in the second the cure was complete in five or six, without a relapse. This truly remark-

able result has been confirmed by a large number of observations collected by Barthez, Bergeron, Frémy, etc. There is one thing especially notable in Barthez' cases, namely, that he obtained a rapid improvement with chlorate of potassium after cauterization had repeatedly failed. But this remedy, after dispersing the patches of false membrane in two or three days, is sometimes powerless over the subjacent ulceration, and it becomes necessary to use much larger doses, or to add to it cauterization with nitrate of silver.

Isambert, who has made observations of great interest upon this point, insists very particularly on the possibility of relapse, and the usefulness of prolonging for some time the use of the remedy after the disappearance of the false membrane. Having shown the success in ulcerous stomatitis, he next shows the powerlessness of the remedy in interalveolar pyorrhœa, which usually yields to topical applications of powdered cinchona and charcoal, with dry chloride of lime, and especially to cauterization by chromic acid as indicated by Magitot.

The same treatment succeeds in aphthous stomatitis, with smaller doses —from ½ to 2 grammes (gr. 8—30), even when the aphthæ are confluent.

Thrush.—Given internally to children, chlorate of potassium did not seem to Legroux to have any distinct action upon the cryptogam which develops upon the buccal mucous membrane. It is probable that in this case the topical use of the remedy would be of more advantage. But we must say that in our own trials the salt seemed to us to be inferior to borax and alum.

Croupous angina.—The success obtained in ulcero-membranous stomatitis very naturally led to a trial of chlorate of potassium in this affection. Blache was the first to try it. The first results were not so satisfactory as in the former disease, but were encouraging. Since then, cases have multiplied in all quarters, and these facts authorize us to consider chlorate of potassium as a remedy, perhaps not sure, but at least able to render some service in this grave disease. But in this respect we must make an observation. Croupous angina has very various degrees of gravity, according as it occurs sporadically or in an epidemic, and it would be supremely irrational to draw conclusions from therapeutic experience in cases so unlike.

If it is true that in malignant angina, especially when epidemic, chlorate of potassium generally fails, as most treatment does fail, it cannot be denied that the same remedy has procured success in quite different circumstances, that is, when croupous angina presented chances of curability. In this respect the observations made at the Children's Hospital, or published by a large number of physicians at Paris and in the country, scarcely permit a doubt. We will say, then, with Isambert, that the usefulness of chlorate of potassium, in cases of medium intensity, seems to us proved, not only by a real and definite success, but by its special and almost elective action upon the pharyngeal mucous membrane, identical with that which is observed in membranous stomatitis. The re-

turn of the rose color, the fall of the false membranes, the lowered pulse, are often obtained in a space of time which is sensibly the same in both cases. This observer adds that cauterization, employed concurrently, does not seem to him to hasten the action of the chlorate at all, but sometimes to impede it. In his opinion, simple astringent washes are preferable to caustics; at the same time, the internal use of tonics, especially cinchona, has seemed to him a very valuable auxiliary. He also notes that cauterization may be indicated after the fall of the false membranes, while at this stage chlorate of potassium tends to lose all its action.

Croup.—H. Chaussier, in 1819, proposed chlorate of potassium in croup, as a reconstituent and derivative. But this remedy fell into complete oblivion. Blache, again, resumed connected experiments with the remedy. Since then there is hardly a practitioner who has not occasionally repeated the same. The first results, without proving great efficacy, indicated the possession of some degree of value in this terrible disease. Under the influence of chlorate of potassium, a certain number of cases recovered without operation, and on the other hand, when tracheotomy became necessary in spite of the use of the remedy, it is remarkable that the cures which were obtained were in much more numerous proportion than is seen ordinarily; thus, in the first three months of 1856, among 14 children tracheotomized, Blache obtained five cures against five, while in the preceding years, the number of cures was only one in four or five operated upon.

But the result has since shown that too much importance should not be attached to these favorable statistics, in which a good part was due to chance; the first illusions have had to disappear before the sad reality. Doubtless, from time to time, some cures can be presented in patients treated by chlorate of potassium, but these observations are by no means convincing, because generally the remedy has not been used exclusively, but almost always in conjunction with other active remedies, especially emetics, which alone have sometimes succeeded. But, as chlorate of potassium seems to have not only a very special local action on the diphtheritic affections, wherever seated, but also is considered to have a general influence over the system, opposing the reproduction of plastic exudations, nothing forbids the use of this medicine in so dreadful a disease as croup, without, however, placing exaggerated confidence in its virtues, and especially, without using it to the exclusion of other treatment, of proved (though perhaps limited) efficacy.

Finally, in order to forget nothing in the long enumeration of the disease in which chlorate of potassium has been used, we mention icterus, in which Odier of Geneva professes to have obtained success, both in the spasmodic form and in that which is connected with an obstacle in the course of the bile, due to a calculus or some similar cause. We will cite also facial neuralgia, chorea, cephalæa, and pruritus of the genitals. But, excepting some good results obtained in certain neuralgias—which, though not entirely convincing, seem at least sufficient to warrant new trials, it

is probable that it is of not much consequence. Finally, we may consider as almost illusory the wonderful results which Chaussier and others thought they obtained in blows, falls, and contusions, in which they gave it both as a vulnerary and as suited to facilitate the resorption of ecchymoses.

Ovarian cysts.—Dr. Graig, of Edinburgh, reports that he cured four women of ovarian cysts by giving each day a tablespoonful of a concentrated solution of chlorate of potassium. So harmless a treatment will surely be repeated.

External use.—In imitation of some foreign physicians, Lasègue has used chlorate of potass in topical applications to certain atonic ulcers, for ulcerations of the mouth, scorbutic gums, etc. In this case he uses a concentrated solution (5 grammes to 100 of water at 15°, or 59° F.), or even the solution saturated at 30° or 40° (86°—104° F.), equalling 12 to 15 per cent. At other times he gave it in powder, alone or associated with bismuth and starch. This topical remedy has an energetic action upon ulcerated surfaces, which it often modifies favorably; but on the other hand, it causes a good deal of pain, which many patients find hard to bear.

The solution of chlorate of potassium has been recently recommended in ozœna. We first cleanse the nasal fossæ of the dried and fetid mucus, by injections of tepid water; we then inject a solution of chlorate (32 parts in 1,000), or strong inspiration is made so as to draw the liquid into the nasal cavities; these injections or inspirations are repeated twice a day for some time. The same means has been advantageously used, both internally and in gargles, to remedy fetor of the breath originating from the stomach.

Cancroid.—The first trials of chlorate of potassium in this affection were made upon animals. Bergeron began by curing a cat of epithelioma of the mouth; subsequently Leblanc cured three similar cases, one in a horse and two others in cats.

The two first cases of the cure of cancroid in man are due, one to Milon and the other to W. Cooke; but they lack detail, and are far from bringing the conviction which is furnished by the precise observations of Bergeron (Académie de Médecine, 1863) and Blondeau. Bergeron in one of these cases used topical treatment alone at first, and in the second he gave the medicine externally only; as did Milon and Blondeau. Other trials have since been made at the Salpêtrière with varying results. It seems to be proved that with these permanent external applications of a saturated solution and small internal doses we can sometimes cure this affection, which from its obstinacy was called *noli me tangere.* Féréol (*Bull. de thérap.*, 30 janvier, 1868) reports a case of cure of cancroid of the cheek by the same procedure. He very justly remarks that this treatment, though sometimes successful, very often fails, and has sought for a reason for this difference. In particular, he observes that his patient had a cancroid of sebaceous origin, and asks whether chlorate of potassium would

not succeed best in this variety. This question requires experiment. We will only observe that cancroid may commence (according to Thiersch) with the sudoriparous or the sebaceous glands. When it affects the latter, it may present two different forms, either the acinous, or the rodent ulcer, and the remedy is perhaps suitable to only one of these.

We have succeeded in producing a very remarkable modification of cancer of the lower lip by continued application of a solution of chlorate of potassium; unfortunately, the cure was not completed, for the patient lost patience and we saw him no more. But we have modified uterine cancroids very notably by the repeated application of tampons containing chlorate of potassium. We have cured by this means fungous and vascular ulcerations which had resisted red-hot iron. We cannot too highly praise this simple treatment in ulcerations of the neck.

Phagedænism.—In 1865 Gaujot applied to phagedænism the dressings of chlorate of potassium, with which Bergeron had succeeded so well in cancroid. The patient had two phagedænic ulcers of the groin, symptomatic of a soft chancre followed by suppurating buboes. The various topics had failed, fire itself having given but transient relief. Chlorate of potassium applied locally in a concentrated solution was more satisfactory. Tillot has seen five cases of phagedænic ulcer cured by the same remedy in Ricord's service (*Bull. de thérap.*, t. LXVIII., p. 273, and LXX., p. 245).

Incompatibles.—According to Melsens, it is dangerous to give a patient chlorate and iodide of potassium at once. Dogs upon which the experiment was tried died in a few days, and it is thought that chlorate of potassium yielded oxygen in sufficient quantity to convert the iodide into iodate of potassium, which is poisonous; the author has also found in the liver and intestines lesions which he had found in poisoning by the iodate.

Acetate of Potassium.

Mucous state.—Marrotte regards the neutral acetate of potassium as an excellent remedy for secretory irritation of the digestive tube, if not immoderate, and if not causing diarrhœa or inflammation of the tube itself; in the latter cases he prefers evacuants or antiphlogistics.

"The presence of the products of secretion upon the visible mucous membrane of the tongue and buccal cavity, their rejection by the stomach or anus, are, independently of other digestive troubles, the signs of the mucous state as of all the varieties of gastro-intestinal diacrises. But it is well to distinguish two varieties clinically; one, in which these products of secretion are so small in amount that excretion is null or almost null; it occurs only at distant intervals, sometimes by the stomach, more frequently (though still rarely) by the anus. He has seen patients who had no evacuations during the whole of their mucous fever, unless artificially provoked or forming a critical phenomenon. The other variety gives rise

to products in sufficient quantity to be rejected almost daily by vomiting or, more frequently, by stool. The former seems a more advanced degree of secretory irritation and is the one which is most manifestly improved by acetate of potassium." He adds that under this treatment the pastiness of the mouth and dryness of the tongue diminish. The stools occur from time to time spontaneously, or are more easily provoked by injections which used to be inefficacious; the urine becomes less dark, the febrile movement, and especially the exacerbations, become less. This is the case also in typhoid fever; the mucous form is improved by acetate of potassium, while the bilious, adynamic, and putrid forms require other treatment.

The mucous state occurs not only in mucous and typhoid fevers, but may (in a "medical constitution") be the dominant state of certain phlegmasias, angina, pneumonia, erysipelas, etc. Acetate of potassium, according to Marrotte, is applicable to all these cases.

Dyspepsias.—The mucous state, whether it precede dyspepsia or not, may so far dominate as completely to efface the character proper to acid dyspepsia, or may only be associated with it. It is in all cases recognized by the mucous tongue, anorexia, nauseas, glairy vomiting, scanty and red urine; with fever if acute; or only with agitation and insomnia if apyretic. In all these cases the neutral acetate of potassium renders more rapid and appreciable services than in mucous fevers (loc. cit.).

Nausea, vomiting.—The true indication for acetate of potassium is found in the nauseous state and the vomiting which accompany the uncomplicated mucous state, under all forms and at all periods of the disease, as during convalescence. According to Marrotte, this action is truly marvellous at the latter period, when the mucous fever passes into acid dyspepsia. It is equally so in chronic acid dyspepsia.

Vomiting of pregnancy.—If the vomiting is associated with an organic lesion of the ovum or uterus, if it is due to gastric embarrassment, or constipation, it yields only to emetics and purgatives, as plainly shown by Paul Dubois and Stolz. When the appetite is retained, the tongue natural, and the vomited matters are chiefly foods; in a word, when the contractions of the stomach seem purely sympathetic and atonic, Madeira wine, champagne at meals, substantial diet, scanty drink, are the true means of retaining the food on the stomach. If, on the contrary, the appetite is lessened or absent, the tongue whitish and woolly; if the matters vomited are pituitous; if the mucous state exists, the acetate of potassium is again incontestably useful (Marrotte, loc. cit.).

Turpentine.

Catarrh of the bladder.—This disease, chronic cystitis, is rarely primary among young people and men of middle age; but it is commonly enough primary in old men.

It affects the former in an acute form, and is almost always the product of a rheumatismal metastasis or an affection of this nature attacking the bladder originally; or of the absorption of the irritant principle of cantharides; quite often it comes from a blow on the hypogastrium, or a fall which gives a shock to the pelvic viscera; the propagation of a blenorrhagia to the neck of the bladder and its cavity also sometimes causes it, and so may the presence of a rough calculus or any foreign body. It is often connected with affections of the spinal marrow, when the latter cause paralysis of the bladder; for in general we may say that in all the paralyses of the bladder, from whatever cause, catarrh of the organ is an almost necessary consequence.

Calculous old men suffer more from chronic catarrh, which also torments old gouty persons and sedentary men who are busied to an advanced age at the desk, especially if they have had blennorrhagia in their youth and retain strictures of the urethra.

The indication for turpentine occurs when the acute period of catarrh is past, or when the disease had the chronic form from the outset; the latter is recognized by the absence of febrile symptoms (though this form is often accompanied, especially in weak old men, by a slight febrile movement toward evening, with heat of the palms, roughness of the skin, dry tongue, thirst and sleepiness), and of hypogastric swelling; by the diminution of vesical tenesmus and dysuria, and by the fact that there remains nothing more than a sense of weight in the pelvis and rectum, difficulty in expelling the first drops of urine, etc.; finally (and this is the pathognomonic mark), by a variable quantity of deposit at the bottom of the chamber, composed of albuminous, thready, semi-transparent matter resembling the white of an egg, strongly adherent to the walls of the pot, even when inverted, or flowing in the form of an unbroken column of mucus from the edge of the vessel to that into which it is poured. Such is the product of mucous catarrh. If there is swimming on this viscus layer a whitish, muddy matter, mixing with the urine and resembling pus, the catarrh is muco-purulent. If the urine is muddy just after its discharge, and soon separates into two layers, the limpid urine above, which is clouded when the vessel is shaken and a whitish matter underneath, which does not adhere to the vessel, formed of mucous crystals of ammoniaco-magnesian phosphate and globules of pus, the catarrh is purulent, and the case is of the gravest kind; it is then that turpentine is indicated.

It is prescribed in the dose of from 4 to 15 grammes (3 i.—iv.) per day, in an emulsion or in boli. It is much simpler to give the gelatinous capsules which contain the essential oil; either the "perles de Clertan" or ordinary capsules. Of the perles de Clertan, from 8 to 12 are given daily; they are never better borne than when taken just at meal time. If the patient cannot bear essence of turpentine by the mouth, it is given in emulsion in an enema, or better, boiled turpentine.

The efficacy of this treatment in chronic vesical catarrh is such, that we may safely say that if the judicious use of turpentine does not always

cure the disease completely, it almost always improves the patient's condition.

We observe three different results in this treatment:

1. Turpentine develops all its physiological action, all its general and special effects.

2. Its action remains incomplete, and is confined to the digestive tract, which it stimulates quite actively, producing downward discharges, with which the great part of the medicine is carried off.

3. The patient experiences neither of these effects. The odor of violets in the urine alone proves that the remedy is absorbed.

In the first case, during the twenty-four hours which follow the use of turpentine, the effects of general excitement may be very various (except perhaps the heat of the epigastrium, nausea, eructation, and cephalalgia), while the vesical catarrh appears sometimes to relapse for a moment into the acute form. The patient experiences heat in the region of the kidneys and ureters, the hypogastrium is more prominent, sometimes very sensitive to pressure; the pains of the bladder are exasperated, while in certain cases there also occurs diuresis, and in others scanty urine, dysury, strangury, ischury, ardor in the urethra and increased secretion of the catarrhal products—in a word, a real recrudescence of acute cystitis. Soon this artificial irritation is calmed, either spontaneously or by the cessation of the treatment; by baths, copious draughts of emulsions and nitre; the catarrhal or purulent matter is passed no longer, or in much smaller quantity. All goes on nearly as if a terebinthinate liquid had been injected into the bladder.

In the second case there is purgation; the patient experiences no diminution of symptoms, and turpentine has no beneficial effect except perhaps a momentary revulsive action. This is the case with many other remedies which are considered to act only by absorption, and seems to prove that the special properties of a therapeutic agent or a poison may be transmitted by means of the nervous system.

In the third case, which, like the two preceding, has been established by observation of a great number of facts, the patient does not perceive effects even after very large doses, and, if it were not for the violet odor of the urine, or still better, the complete cure of catarrh, it might be doubtful whether the system had experienced any modification, and we might suppose that turpentine had been absolutely inert. But in many of these cases, though the odor of violets proves the fact of absorption, the catarrh of the bladder receives no more influence than the rest of the system.

The three general categories of effect in which we believe we have summed up all of the cases, occur also in the physiological action of this substance, and we have a right to use the former to explain the latter. The latter differ only by the momentary exasperation and the cessation of the symptoms. This fact is related to the state of the vesical mucous membrane in the patient. Although it is modified by the therapeutic

agent in the same way as when it is in health, the membrane responds differently to the modification; it acts in a way which we might expect of any mucous surface affected with catarrh, which has been irritated.

We therefore compare the therapeutic action of turpentine in chronic vesical catarrh with the evident and incontestable effect which it produces when, applied directly to the mucous surfaces, which are the seat of a muco-purulent discharge, or suppurating cutaneous ulcerations, it stimulates their vitality to the point of irritation, increases primarily exhalation, and finally brings the parts into a state in which they cease to furnish morbid products, or cicatrize; in a word, we believe in a method of action for turpentine *by substitutive irritation*, even when this substance is taken internally, and changes the state of the mucous membranes only by passing along the channels of absorption and circulation. The identity of that which occurs in this mode of administration and that which is seen when it is injected into the bladder, would alone suffice to make us regard this opinion as the most probable. We shall develop this at a later point.

We have to add a few remarks on the treatment of chronic catarrh of the bladder by turpentine.

First, it is hardly necessary to say that this treatment cannot radically cure catarrhs symptomatic of gravel, urinary calculi, or foreign bodies from without, retention of urine through paralysis of the bladder, or stricture of the urethra with complete or considerable obstacle to the passage of urine. It is the same when there are affections of the prostate which irritate sympathetically or mechanically the vesical mucous membrane, etc. In all these cases, nevertheless, we ought not to give up the use of turpentine, for observation shows that even in catarrh symptomatic of stone, it is useful as a palliative to lessen the quantity of morbid products secreted by the bladder; a secretion which alone contributes considerably to the weakening of calculous old men. It is in idiopathic catarrh, caused and maintained by the diverse causes which we have mentioned, that the use of turpentine will be especially opportune, and often heroic, if given in the doses we have determined.

In spite of the authority of the English, we regard it as prudent to give turpentine only in the chronic or subacute form of vesical catarrh, when almost all the disease consists of exaggerated or vitiated pathological productions. The innocence, or rather the efficacy of copaiva in the most acute blennorrhagias, might lead us to believe that the same advantages could be obtained in acute vesical blennorrhagia. In all cases it will be wise not to begin to use turpentine before we have performed general, or still better, local bleeding, proportional to the intensity of the symptoms, and have used for some time prolonged full baths, emollient fomentations, abundant emulsionized drinks, camphorated or nitrous draughts, etc., etc. To avoid the risk of accident from a premature and dangerous use of turpentine, we also recommend to test the susceptibility of patients, and to begin by prescribing some drinks which have an analogous and

less energetic action, and which, as they are well or ill borne, or produce more or less benefit, will inform the physician whether he may adopt the new treatment or must postpone it. These drinks may be indifferently of tar-water, or the infusion of the buds of the Northern pine, or of juniper-berries, substitutes and adjuvants of turpentine which we shall study farther on.

We know how variable the physiological action of turpentine is, since a small dose produces in certain persons quite violent symptoms, either primarily upon the digestive tube, or secondarily upon the whole system, and certain systems in particular; while others are cured by enormous doses without paying any price except the ordinary physiological disturbance. Hence, we ought to begin with small doses, which suffice for certain persons, and may increase at need. This plan avoids excessive action upon the digestive tract, and does not cause wasteful evacuations which may prevent the absorption of the principles, which in this case perhaps act by purging only. If the state of the stomach permits us to infer beforehand that it will not bear turpentine with all the precautions, or if the patient vomits obstinately (which is very rare), we must use enemata.

Another important precaution consists in not discontinuing the use of turpentine until the urine ceases to contain catarrhal or purulent matter, but to continue its use for several days or weeks in successively decreasing doses; for nothing is more common than relapses of vesical catarrh, except those of urethral catarrh.

It is very important to know the conditions favorable to relapses.

All catarrhal affections, all the mucous fluxes, are closely subordinated to the barometric variations of the atmosphere, the different constitutions of temperature, which in most cases suffice to produce, and much more to maintain them. Catarrhs of the urinary passages, especially of the bladder, are more exposed to these influences than any other kind. How often have we heard Dupuytren predict relapses of these catarrhs, or their improvement and cessation, from the sole fact of observing that the temperature changed from cold or hot dryness to warm moisture (and still more so if cold moisture), in the former case, and the converse in the latter case. Old men who suffer from this disease predict with certainty the atmospheric changes by the degree of limpidness or turbidity of their urine. The practitioner ought to be impressed with this circumstance in order to direct the use of turpentine prudently, not to give it the credit of changes which it has not wrought, and not to impute to it a lack of activity which does not belong to it, but to the unfavorable conditions under which treatment is undertaken. Does it follow that the efficacy of turpentine is illusory and wholly dependent on the time when it is given? Such is not our meaning.

The action of cinchona is certainly not illusory, because it is often given to those whom mere rest, or change of some unnatural circumstance, would relieve of the fever. But we are permitted to turn to the benefit of a treatment all the elements of success that can be united, to aid the

efficacy of turpentine by the coalition of favorable temperature, and conversely, as in all treatment.

To neutralize as far as possible the bad effects of damp cold in persons affected with chronic catarrh of the bladder, and thus to judge correctly of the action of turpentine, nothing is better than to wear next the skin, from head to foot, woollen garments, especially flannel, and moreover to avoid all cold and dampness of the feet.

The momentary exasperation due to the action of turpentine may be not so transient and limited as it ought; the period of remission and cessation of the catarrhal flow may not promptly follow the artificial exacerbation which is often the means of cure, or may not follow at all. The latter case is rare. The former, in which the increase of symptoms seems excessive, disproportionate, and slow to end, requires us to suspend at once the use of turpentine, and to give the patient emollient drinks, acidulated or very slightly aromatized; and general baths, or even leeches to the hypogastrium. The gradual, opportune and regulated use of preparations of turpentine or analogous agents, according to the rules we have indicated, rarely exposes to these inconveniences, which are never serious, and readily disappear.

The use of turpentine is not contraindicated by a great probability that the vesical mucous membrane is ulcerated, and that the pus in the urine comes from these ulcers. Direct observation, and the effects of the application of turpentine to visible ulcerations of the skin and mucous membranes, should convince us that this contraindication is not well founded. It is much more rational to ask, how far an affection of the kidneys complicating catarrh of the bladder places obstacles in the way of using turpentine.

Diabetes.—The kidneys of almost all diabetic patients whom we opened were free from phlegmasia, but generally pale, bloodless, soft, and as if macerated. Is there any chance of re-establishing the normal secretion by stimulating their vitality, by modifying the circulation and nutrition of these organs by the special action of turpentine? We could answer: experience has already given a negative reply. The whole disease, and the finding of the kidneys of diabetic patients in the most perfect integrity, seem to prove that there is in this severe affection something more primitive and considerable than a mere derangement of the uropoietic functions, analogous to a special perversion of general nutrition or a faulty chymification. But this condition should not be such as to make useless all therapeutic efforts to modify the kidneys and change their mode of secretion. In our first edition we called for a trial of turpentine in Bright's granular kidney. This trial has been made without success by Rayer. We have recommended it with advantage in chyluria (fatty or milky urine).

Catarrhs of the mucous membrane, other than those of the urinary passages, are less certainly modified by turpentine. Thus, we have in copaiva a much surer means of curing urethral discharges, and for this rea-

son we reserve what we have to say on this subject for the article on copaiva.

Pulmonary catarrh.—Chronic pulmonary catarrhs can be modified favorably by turpentine. The favorable cases are those of persons affected with muco-purulent bronchorrhœa, in whom the quantity of sputa not seldom equals several pounds a day, without much cough, without any symptom of irritation, with a mucous membrane which is often thickened, but rather discolored than injected, a partial or general dilatation of the bronchi, etc.

We have several times observed this form of pulmonary catarrh when it simulated the most advanced tuberculous phthisis; and it must very often have occasioned errors of diagnosis among the old physicians, who gave a distinguished place in the treatment of phthisis to the balsamic substances of which we speak. Let us add that, in spite of all the improvements in our means of local diagnosis in pulmonary phthisis, these cases still deceive us, not only through the fearful purulent discharge, the night-sweats, the diarrhœa and marasmus which in some cases are superadded, but also because the bronchial dilatation of which we spoke may give to percussion several of the signs reputed to be pathognomonic of tuberculous phthisis in the third degree.

The mode of administration is the same as in the case of vesical catarrh. These are the cases in which the balsamics, especially turpentine and tar-water, are able to work a sort of miracle, bringing back to life patients who seemed to be marching to an inevitable death through all the stages of the most rapid colliquative consumption.

We will now look at the great suppurations which require to be moderated or suppressed, and the indications presented by them for the resinous and balsamic substances.

Colliquative diarrhœas.—Good authorities have recommended the use of turpentine for the purpose of obtaining effects of an apparently opposite nature, but which are nevertheless not contradictory. Thus, Cullen states from his own experience that this substance "is one of the most certain laxatives that can be used in colics and other cases of obstinate constipation;" while Baglivi and Van Swieten have used it with success in chronic and colliquative diarrhœas. The former of these great physicians remarks in his interesting chapter "De diarrhœa et dysenteria:" "Inveteratis alvi fluxibus, dysenteria, tenesmo, relaxatione ani, etc., excipiatur per inferiora vapor Terebenthinæ prunis ardentibus injectæ, et sanabuntur."

We ought perhaps to have spoken of this under external treatment, as it refers to fumigations of the anus, but we wished to compare Baglivi's practice with Van Swieten's, who also gave turpentine in colliquative diarrhœa due to resorption of pus in phthisical patients in the last stage of tuberculous break-down of the lungs: "In consummata phthisi, a pure resorpto, totum sanguinem corrumpi et sic dissolvi, ut per mesaraica vasa elapsi humores putridissimam diarrhœam faciant quæ et mor-

bo et vitæ finem brevi imponere solet," etc. He thinks nothing more suited to calm this diarrhœa and to prolong life, which is so often shortened by it, than injections prepared with 4 grammes (ʒ i.) of well purified turpentine triturated with the yolk of an egg, with the addition of 15 grammes (gr. 75) of theriaca and 120 grammes (ʒ iv.) of milk. The enema must be retained as long as possible. It is not surprising that turpentine is given as a laxative; nor that it should arrest a mucous flux from the intestine, for it does the same in the case of many other morbid secretions of the same sort, and its desiccative property is one of its most characteristic points.

It now remains to study specially the indications for the use of essence of turpentine internally: 1, in neuralgia; 2, for intestinal worms, especially tænia; 3, for hepatic colic symptomatic of biliary calculus; 4, in puerperal peritonitis.

Neuralgia.—If we do not consider Galen the first to make internal use of essence of turpentine in neuralgias (for the expression "pains of the joints" is not sufficiently precise, and he used turpentine, and not the essence—two weak arguments), we must come down to Home, Herz, Thillenius, Cheyne and Pitcairn, to find it explicitly recommended, as it has been in France more recently by Professor Récamier and others.

Murray speaks of it as a remedy commonly known: "Plebis domesticum est in malo ischiatico et rheumatismis, melle excepto vel liquido quodam." His formula is as follows:

℞. Essential oil of turpentine..... 8 grammes (ʒ ii.).
Honey..... 30 " (ʒ i.).

Mix; take a small teaspoonful morning and evening.

Cheyne caused equal parts of turpentine and alcohol to be distilled repeatedly. Of this he gave from 4 to 16 grammes per day (ʒ i.—iv.). He believed that when thus given the essence retained all its antineuralgic properties and lost its objectionable points, which has been denied by Martin recently. Professor Récamier used the following formula in most cases: Essence of turpentine, 8 grammes (ʒ ii.); mel rosatum, 120 grammes (ʒ iv.). Three teaspoonfuls of this mixture are taken daily. To disguise the intolerable flavor, agreeable syrups may be added, various distilled aromatic waters, or laudanum if the patient is inclined to vomit, etc. It is better to give the essence in capsules.

The internal action may be aided by frictions to the seat of pain with the following liniment:

℞. Oil of chamomile..... 60 grammes (ʒ ii.).
Essence of turpentine..... 30 " (ʒ i.).
Sydenham's laudanum..... 4 " (ʒ i.).

If in eight or ten days there is no result, the treatment must be abandoned.

The results of the celebrated practitioner whom we have named, and who was the first in France to treat sciatica with essence of turpentine, were first chronicled in Martinet's thesis (Paris, 1818). The latter, in describing the immediate effects of the dose of 4—12 grammes (ʒ i.—iii.) in sciatic neuralgia, notes in addition to the symptoms we have named a heat, accompanied by sweat in the lower limbs, particularly in the one affected, and more especially along the track of the nerve. Cullen observed this fact, and did not hesitate to attribute to it the efficacy of essence of turpentine, which had already been proved by Cheyne and Pitcairn in neuralgia and rheumatism of the limbs. Home, who used this agent a great deal in this case, attributes all its effects to this action, which he calls topical.

Martinet enlarged his thesis to a mémoire in 1824, and published a second edition in 1829. The latter work states that of sixty-six patients then treated, including those reported in the thesis, fifty-eight were cured. Among this number fifty-five were cured by the internal use of the essence, and only three to frictions alone.

It is important to give the author's view of the conditions which are favorable and unfavorable to the use of essence of turpentine in neuralgia.

1. The most success is obtained in neuralgias without alteration of the nerve, especially in idiopathic and permanent cases.

2. Other things being equal, the chances are favorable in proportion to the distinctness with which the neuralgic character is marked, and the acuteness of the pain, whatever may have been the failures with other remedies.

3. The remedy seems to confirm its superiority in neuralgias of the lower extremities, especially sciatica.

4. Martinet cuts off the rheumatic cases, neuritis, neuralgia symptomatic of compression by a tumor or other organic lesion developed in the neurilemma, etc., from the list of those susceptible of favorable treatment by essence of turpentine.

The *Revue médicale* (août, 1823) contains an account of six out of seven cases cured by Dufour. He observed neither purgative, nor sudorific, nor diuretic effect, but the results were favorable and prompt.

At the same period Delaroque quoted to the Académie de Médecine twelve or fifteen cases of success.

The reading of Martinet's observations is likely to carry conviction to a physician's mind. What is the use of refusing to accept unless we can explain them, as if to console one's self for the repugnance felt in admitting facts which contradict a preconceived notion ?

Raige-Delorme, for instance, in an analysis which he gives in the *Archives de médecine* for 1824, t. IV., p. 400, of the first mémoire of Martinet, devolves upon the irritation of the digestive tube produced by essence of turpentine all the immediate and consecutive effects of the remedy, claims all for revulsion, etc. All who have praised the treatment in question (let it be remarked) call attention emphatically to the fact that

the remedy succeeded with promptness and thoroughness in proportion as it acts in silence, and without causing alvine evacuations! It would be unreasonable and imprudent to efface these facts by a hard and rude negation.

We do not think any one in France has used turpentine oftener than we have; and if in many cases we have found the value of essence of turpentine in neuralgias, we have also very often seen it succeed where all other remedies had failed. We invariably give the essence of turpentine in capsules, in doses varying from 60 to 200 drops per day; we consider it also a most necessary point always to give them during the meal. In the treatment of sciatica which may be called idiopathic, as depending neither on a paludal infection, nor an organic affection of the pelvic viscera, nor an osseous lesion, etc., we affirm that considerable relief is almost invariably obtained, and most usually cure.

It has not seemed to us that neuralgia of the upper limbs were less usefully treated by essence of turpentine; we except neither the intercostal forms nor those that occupy the head.

We do not mean that it is right always to use turpentine exclusively, and that in a great number of cases the previous, simultaneous, or subsequent use of belladonna, cinchona, or opium is not very valuable; but essence of turpentine is not inferior to any of those we have named, and cures in cases where they have been entirely useless.

The visceral neuralgias, so obstinate and so common, especially in women, are more effectually reached by essence of turpentine than by any other remedy; it is singular that neuralgia of the stomach and all the viscera which are more particularly related to the solar plexus, are those which best obey the action of this powerful agent. It is strange to see delicate women enduring with marvellous ease considerable doses of essence of turpentine; the neuralgias, even those of the stomach, are very rarely increased by the remedy. In this case we only give it six or eight days in succession, and resume it after waiting about two weeks. We quite often alternate with the use of nitrate of silver, which we give in pills of 1 centigramme (gr. 0·15) twice or thrice a day in the intervals of meals, for three or four days only.

In rare cases, if the essence is ill borne, we give Sydenham's laudanum, in the dose of one drop, or two at most, whenever the capsules are taken.

For several years we have invariably used the capsules; persons who cannot swallow them take it in tea, coffee, brandy-and-water, or some aromatic infusion; but this mode of administration has inconveniences. The disgust is not very great at the first, but in a few days it becomes invincible, and the simple odor of turpentine causes vomiting. Even in those who feel no disgust, the irritation of the pharnyx and œsophagus causes an intolerable local heat and vomiting, while if taken in capsules with the food, it scarcely irritates the mucous membrane of the stomach, and never that of the pharynx and œsophagus.

Tænia.—We owe to foreigners, especially the English, the facts which attest the anthelmintic properties in general, and particularly as regards tænia, of large doses of the essential oil of turpentine. Before it was used for man, it was found to have these powers in the case of animals. Chabert spoke highly of its value in expelling the entozoa from cattle, in the dose of one or two ounces of a mixture of empyreumatic animal oil (one pound) and essential oil of turpentine (one kilogramme and a half) distilled together. But the first cure of tænia in man was due to chance.

A sailor had tænia, and noticed that whenever he drank much gin he passed a portion of the animal. The gin used by the English sailors contains essential oil of turpentine instead of juniper-berries. The sailor attributed the result to this ingredient, and took it pure in large doses. The tænia was expelled. Encouraged by this fact, John Hall took 3 ounces in the morning fasting, and repeated the dose in two hours, as the first did not operate. Malaise, headache, intoxication, abundant stool, in which was found the entire corpse of the entozoon. No relapse. Dr. John R. Fenwick, of Durham, reports six cases of cure of the same disease by the same remedy. He gives the essential oil pure in the morning fasting, in the dose of 2 ounces, and soon afterward another ounce, which acts as a purge, and produces the expulsion of the tænia, slain by the first draught. Among six patients four were relieved, and the worm did not return; two had relapses, and a second treatment cured them permanently.

Cross, in an interesting paper, from which these observations are taken (*Journ. de méd. de Leroix*, t. XXXV., p. 147), reports from his own practice a very conclusive case in favor of the use of essence of turpentine for tænia. A multitude of drastics and anthelmintics had long been used in vain, and had never procured the evacuation of more than a few detached segments. The symptoms persisted. The remedy was used in the above doses and with such success that no relapse occurred in eight years following.

Chaumeton, in an analysis of Cross' paper (Ibid.), relates a case of similar cure from the practice of Dr. Marc, who communicated it to him. The prescription was as follows: Essential oil of turpentine, 32 grammes (℥ i.); syrup of gum, the same; mint-water, 250 grammes (Oss.). Cross also mingles the essential oil with twice its weight of syrup. He says he knows a number of cases where patients were cured of tormenting itching of the end of the large intestine, caused by ascarides, by this remedy. In this case it sufficed to give the essence in enema, mixed with a mucilage. Peschier and Maunoir of Geneva have proved the vermifuge properties of the essence of turpentine. Dr. Kennedy has five or six very curious cases in much detail, to be found in vol. III. of the *Archives de médecine.* He often mixes the essence with castor-oil.

It is needless for us to give the list of English physicians who have proved the remedy, always with success. Merat and De Lens say they have used it twice for tænia, and both times the animal was reduced and passed in a pulp. They add that this treatment is little used at present:

1, because it is not always effective; 2, because it sometimes causes severe symptoms; 3, because we have more certain tænifuges. These reasons seem to us vague, not peremptory, insufficient to discredit the vermifuge use of the essential oil; this is the more striking as the conclusions of these authors follow directly upon the announcement of two complete successes.

Biliary calculi.—The frequency and importance of biliary calculi have been very long known. The great masters of the past centuries correctly assigned to them the entire series and variety of symptoms which modern pathological anatomy has proved to belong to them. We are even persuaded that Ettmüller, Blanchi, F. Hoffmann, Boerhaave, Van Swieten, Baglivi, Lentilius, Valisnieri, Heberden, Durande, etc., have written on this point of the pathology of the liver more complete, true, scientific things than have appeared in our day. Almost all these old practitioners had sought a solvent for biliary calculi, and had cast their eyes on spirituous volatile liquors, from Ettmüller, who regarded sweet spirit of nitre as capable of acting a little on these stones, and Poultier, who attributed the same power to pure alcohol, to Boerhaave, who employed for this purpose the essential oil of turpentine unmixed; Withe and Valisnieri, who combined the two spirituous liquors, which previously had only been used separately, and finally Durande, who in 1773 (not 1782, as Sprengel gives it in his "History of Medicine") substituted sulphuric ether for alcohol, and published in 1782, in the semestres of the Academy of Dijon, his mémoire on hepatic colics and their treatment by the famous mixture which has borne his name.

Durande gives a very satisfactory and complete history of biliary calculi, enlarges upon their dangers, prognosis, differential diagnosis, etc., discusses the advantages of some accessories, as bleeding, alkalis, baths, etc., and then adds:

"After a long use of humectants and diluents (six weeks to two months), and gentle aperitives, the solvent of biliary stone is given in the dose of 4 grammes (3 i.) every morning, adding a dish of buttermilk, or veal-tea with chiccory, or syrup of violets with pure water. If this remedy agitates and heats too much, if the region of the liver becomes painful, we bleed and continue the baths. But if the liver swells with very little pain, and the patient is rather weighted than heated, we use the most gentle aperitives and tonics. The remedy is continued a longer or shorter time according to the age and obstinacy of the disease; but quite generally 500 grammes of a mixture of sulphuric ether and volatile oil of turpentine are to be taken. When there is no yellow tint in the face or eyes, when the hypochondriac pain ceases, when no anxiety is felt, even after eating and exercise, it is thought that health is returning, the course of the bile free, and that it is time to use gentle purgatives, which then act usefully, without causing the least pain in persons who, before using the solvent, had been the most fatigued by using these remedies.

"Next, we must try to prevent the return of the colics, and the formation of new calculi by coagulation of the bile. The means which render

the circulation of the bile more free in the vessels of the vena portæ will prevent the thickening of the bile. From this point of view, gentle aperients have their use; but most generally the cause of the return of the malady is heat of the liver and abundance and acrimony of the bilious humor. All that makes the bile yellow and penetrating, a bad mouth, a strong breath, should be proscribed as irritant; also the fats, salted food, excess of animal food, spirituous drinks; spices, bitter, acrid, or heating plants; as cress, asparagus, artichokes; the too frequent use of purgatives, fatigue, and watching, are very contrary to these patients. A mild and moderate diet with meat, chiefly boiled or roast fowl; grasses, farinaceæ, very ripe fruits; diluent drinks, as buttermilk, lemonade, lemon and orange; acid tartrate of potassium, mineral waters, suitable bleedings, asses' milk, have seemed to me sufficient to prevent the return of the malady, especially when at very distant intervals small doses of the solvent of the calculi are given, or the solution of yolk of egg in ether (as recommended by Morveau) may be given instead, as it seems sufficient to prevent the formation or to dissolve them in the beginning. The latter remedy will have the advantage of being less disagreeable to patients."

Durande's mixture was first composed of equal parts of sulphuric ether and essence of turpentine; afterward he lessened the proportion of the latter by a third, using three parts of ether and two of essence.

The author appends to his paper twenty cases of his own, and some others which Marey, Lavert, and Hoin communicated to him; all attest the efficacy of the mixture.

We do not question these observations, nor the accuracy of their details, nor the importance of all their elements, nor their authenticity, nor the precision of diagnosis, at least in a certain number, nor even the good results. They leave us in doubt upon only one point, and this is the point which Durande has tried at all hazards to prove, namely, the *dissolvent* power of the mixture of ether and essence of turpentine. How can this kind of action be demonstrated? Nothing less is required than the concurrence of several circumstances which very rarely can be united; perhaps they have never been in the degree necessary to produce conviction. It would be necessary: 1, to have clearly established a tumor in the region of the gall-bladder, which presents a distinct inorganic resistance, so to speak, a strong resistance; a tumor which, when compressed or percussed, gives to the touch or the ear a sensation or a noise like nuts rubbed together in a little bag, as J.-L. Petit observed; 2, that in such a case Durande's mixture should have been given some time, and that the tumor should have disappeared more or less slowly, without biliary concretions being found in the fæces. Such symptoms must have been repeated a great many times, in several persons; the treatment must be suspended and resumed; to see if the disease, or rather, its motival cause, would correspond to these changes, etc. Outside of these circumstances (almost impossible to unite), there can be nothing but doubt, or at most probability, arbitrary interpretation, or individual views.

How far do Durande's observations fall short of these indispensable elements! What do we see? Patients subject to frequent indigestion, seized with more or less genuine hepatic colics, vomiting, usually jaundice; this series of accidents returns at intervals, and in a few cases is accompanied by the passage of some biliary concretions in the stools before treatment.

The treatment was established in accordance with principles stated above; classic or rational medicine (as we say) precedes, accompanies, and follows rigorously the professed specific treatment, that is, the solvent mixture of ether and turpentine; the patients are considerably solaced or radically cured. Is not that enough? Why not confine ourselves to observing this effect, attributing it to the treatment if we think it just to do so, without pretending to seize the intermediate term between the remedy and the result? Is not this prudent empiricism preferable to an explanation which is probably erroneous, and which, perhaps, only arouses distrust of the proposed remedy, because the falsity and absurdity of the theory clings to the fact? If the remedy is useful, and we do not deny it, why not content ourselves with positing the conditions of this utility instead of having the vanity to seek for those of its intimate action, with no result but to discredit the remedy by an association with the ephemeral fate which attends all explanations?

Durande reasons principally from the fact that biliary calculi, placed in contact with the mixture in a vessel, or simply exposed to the vapors which rise from it, soon become friable, and are entirely dissolved. We need not insist on the faultiness of the analogy. Ether or the alcohols, he says, are incapable, when alone, of dissolving hepatic calculi, and yet several physicians before him, those whom we designated above, have professed to accomplish results like his with both these liquids.

A still more striking point in his observations is the rapidity of the action of the remedy and the character of the element of the disease against which this action seems chiefly directed. The symptom *colic* is the one principally attacked by this remedy, and it is capable of calming it better than any other remedy. It is inconceivable that the dissolvent virtue of Durande's mixture should be developed in so short a time as is required in order to dissipate the hepatic pain. An alterant action of this sort presupposes a slow, insensible, molecular operation, all of which is incompatible with the instantaneousness which is remarked in the disappearance of a nervous phenomenon under the influence of terebinthinated ether.

We know that Durande, in virtue of the idea he has formed of the mode of action of his remedy, orders the protracted use of it; but independently of the fact that this proves nothing (for some of his patients who have not followed his advice have had no relapses), several others took only ether with yolk of egg, and he himself tells us that ether has not the property of dissolving biliary calculi.

Some of the patients passed calculi, and in these cases the dissolving

action is not a necessary hypothesis; others did not pass them, though several had a series of symptoms which might easily have been associated with the existence of biliary calculi; but what obscurity !

Some persons after the suppression of eruptions, of accidental secretions, of supplementary functions; certain bilious melancholic old men, are seized with symptoms of indigestion, of general languor, atrabilious cachexy, epigastric or hypochondriac pains, vomiting, constipation or discolored stools, alkaline urine, icterus, etc.; they are subjected to a very long diluent, or as formerly said, alterant diet, to laxative enemata, minorative, aperient, soapy, alkaline drinks, the mineral waters of Seltz, Vichy, whey, etc.; and then they take a volatile mixture, and are reestablished after a more or less protracted administration, finished with purgatives and a return at intervals to the famous mixture, etc. How is the dissolvent action then proved? Because the course of the bile is reestablished, the stools are colored, or a black, thick bile is passed, which is said to be the matter of the calculus in a fluid condition.

We admit, as a result of our own observations, that there are certain derangements of the biliary functions characterized by unexpected icterus which cannot be associated with any appreciable hepatic lesion, by a profound languor of the whole system, and the digestive functions in particular, obstinate constipation, mortal discouragement, sometimes the sensation of an epigastric bar, of weight in the hepatic region; at least, in some cases, death, without the discovery, at the autopsy, of any alteration which bears a relation to the severity of the disease. Such are the atrabilious diseases of old authors. But these affections seem ascribable rather to inertia of the secretory and excretory apparatus for bile, to atony of the circulation and innervation of this important region, etc., than to any other cause; and experience proves that the regimen and drugs which have the property of fluidifying our humors are those which Durande used freely and protractedly for his patients, and that purgatives, and all that can arouse the sensibility of the digestive tube and stimulate the secretions, as exercise on foot, on horseback, in a carriage, etc., experience, we say, proves that these hygienic and medicinal resources combined are useful in the cases we have named. This is the way in which we interpret the success of Durande and of those who follow his practice.

Terebinthinated ether has, incontestably, the property of quieting the atrocious colics and vomitings which often accompany the biliary calculi and certain hepatic neuralgias; we shall consider this property as purely antispasmodic, and the fact is not a new one. Durande has at least the merit of well understanding the diseases produced by biliary calculi, and applying a good form of treatment.

Poisoning by phosphorus.—Since the invention of chemical matches, phosphorus, which is one of the most poisonous substances, has been in everybody's hands. It has thus become the most common agent for poisoning, whether accidental, suicidal, or criminal.

The symptoms are very severe, and until quite lately we had no satisfactory remedy. The sagacity of Dr. Andant, of Dax, has placed in our hands an antidote which has hardly failed since it was discovered.

It was long known that the vapors of essence of turpentine prevented the oxidation of phosphorus, and this property was made useful in Black & Bell's match factory at Stafford. A little tin box of essence of turpentine hung to the neck of workers in phosphorus-paste was found a sufficient protection against the necrosis of the jaws. The success was such that the plan was adopted in spite of the danger of fire. Still, no one thought of using the prophylactic as a remedy for cases of poisoning by swallowing phosphorus.

August 18, 1868, a workman aged 63, named Pémartin, living near Dax, being destitute and tired of life, attempted to destroy himself. He took successively three boxes of matches, chewing the ends covered with phosphorus-paste, and then, not finding himself poisoned with sufficient quickness, he thought to hasten the action by swallowing some essence of turpentine which was at hand. He had some digestive trouble, pains in the stomach and bowels, but neither vomiting nor diarrhœa. The worst symptoms were extreme thirst, and marked heat in the head and eyes. The treatment consisted of abundant drinks, and by advice of Dr. Andant, a purgative dose (℥ ss.) of calcined magnesia.

Believing that turpentine only had relieved the patient of the ordinary symptoms of poisoning, Andant used it on the next occasion, which was on the 4th of December following, when he was called to a woman who had just tried to poison herself by matches. He gave essence of turpentine, and the patient recovered. He used the same treatment twice more, and the patients also recovered. Others have since employed his method with equal success. Dr. Rommelaere, Professor at the University of Brussels, gives three cases (*Bulletin de l'Académie royale de médecine de Belgique*, t. V., 3ᵉ série, No. 9, 1871), Laboulbène gives one (*Gazette hebdom.*, 14 août, 1874), and Köhler and Lichtenstein one (*Berliner klin. Wochenschrift*, 1870).

The dose used by Andant and his followers consists of 4 grammes (ʒ i.) a day, in the following draught:

Mucilaginous potion.....	100	grammes	(ʒ xxv.).
Syrup of orange-flowers.....	20	"	(ʒ v.).
Essence of turpentine	4	"	(ʒ i.).
Gum tragacanth.....	0.25	"	(gr. iv.).

This is the principal remedy, but we must not neglect certain precautions to ensure success. The first thing to do (it is a general rule in all cases of poisoning) is to put two fingers immediately into the patient's mouth and provoke efforts to vomit. This acts at once, and has the additional advantage of not irritating the stomach as emetic drugs do. In poisoning by phosphorus, when the mucous membrane of the stomach

is already inflamed by the presence of the poison, it is well to remember this precaution.

A second rule, long ago pointed out by Mialhe, consists in not giving to the patient fat, which would dissolve the phosphorus, and thus aid in its absorption. Neither milk, nor castor-oil, must be given, and if broth is given it must be freed from fat by letting it cool and skimming it. The failures in certain cases are due to neglect of these points. The removal of phosphorus by sulphate of copper given as an emetic, and prescribed by Bamberger on theoretic grounds, is not to be thought of, nor are the inhalations of ether, proposed by Bellini; nor the alkalies and chlorate of potassium.

In order to understand the mode of action of turpentine in these cases we should first remember that phosphorus is soluble in essence of turpentine and loses its phosphorescence. Köhler and Schimpf (quoted by Rommelaere) also found that phosphorus combines with turpentine so as to form a substance analogous to spermaceti. This combination does not occur with pure essence of turpentine, but with essence made impure by contact with atmospheric oxygen. This substance given to dogs in alcoholic solution, in the dose of a gramme (gr. 15), causes no symptoms of intoxication, does not disturb the appetite, and is eliminated by the urine, to which it gives a characteristic camphorated odor.

These different points have been confirmed by Wetter of Dresden.

The dose of 4 grammes, ordered by Dr. Andant, may be easily increased to 10 on the first day, as done by Rommelaere, or even 30, as in Laboulbène's case.

Hœmorrhage.—Turpentine forms the basis of most of the hæmostatic waters. They have been used with most success in hæmoptysis.

Essence of turpentine is so hard to administer that the preparations and vehicles ought to be varied. We recommend, as a convenient and efficient form, the syrup of turpentine, which we have often used with success in all cases where the internal use seemed indicated. The syrup is given in edulcorant dose.

Disinfection of wards for paralytics.—At the time when one of us had charge of the infirmary of the Bicêtre, we tried to remedy this trouble and succeeded fully. We first noticed that the smell is almost exclusively due to putrid fermentation of urine, and much less to fæcal matters. At the moment of discharge, the urine of these patients is almost always acid, but soon ferments, and though the linen is changed regularly four times a day, the putrid fermentation of the urine is sufficient to infect the air. We thought that if a substance was made to pass through the urine which was opposed to putrefaction, the cause of the infection might be suppressed. We selected boiled turpentine, that is, deprived of its essence. This resin is eliminated by the urine, and answers the purpose very well. For nearly a year we employed this prescription at the infirmary, giving to each patient a pill containing 20 centigrammes (gr. 3) of boiled turpentine, twice a day, in his soup. They

hardly knew they were taking anything. No function was disturbed, and the wards ceased to be infected. We visited the room which contained as many as fourteen such patients, during the hottest weather, without observing any bad smell.

Iritis.—In 1829, Carmichael, of Dublin, and a little later, Guthrie (*London Med. Gazette*, t. IV., p. 509) praised the essential oil of turpentine in *slow inflammation of the iris and the choroid.*

Flarer, Professor of Oculistics at Pavia, began experiments in 1834; his results, as shown in a biennial résumé by Dr. Trinchinetti, agrégé at the clinic, are the following. After the other remedies had failed, turpentine succeeded in four cases of primary iritis, of subacute and chronic form, caused by rheumatism or arthritis, or traumatic; in the last there was also glaucoma, which was improved, and sight partly restored. It was also successful in eight cases of chronic iritis consecutive to operation for cataract by scleroticonyxis, as by keratonyxis, in persons of different ages and temperaments. These deep inflammations of the eye were more than once accompanied by keratitis or hypopyon. In another patient the essential oil of turpentine failed; the inflammation was due to a persistent mechanical cause, the presence of the deplaced and movable crystalline pushing against the circle of the pupil.

Essence of turpentine, according to the experiments of Flarer and Trinchinetti, relieves local pain, calms the general state of the system, lessens ocular congestion and lachrymation, and favors the absorption of pus or blood effused in the laminæ of the cornea or in the anterior chamber.

Instead of producing a purgative effect, as most pharmacologists state, it more usually constipates; it also exercises a marked action upon the stomach; thus it has sometimes caused acidity and brought on the condition named gastrism.

The best method of administration seems to give it suspended in an emulsion of almonds; the dose varies from 2 to 16 grammes to 180—250 grammes of vehicle, taken in three parts during the day. This is Carmichael's formula:

℞. Essential oil of turpentine..... 16 grammes (℥ ss.).
Yolk of one egg.
Mix; add by degrees.
Emulsion of almonds..... 125 " (℥ iv.).
Syrup of orange-peel..... 64 " (℥ ii.).
Essence of cinnamon..... 3 or 4 drops.
To be taken by spoonfuls during the day.

It is found that the addition of 0·20 gramme of subcarbonate of sodium was the best means of preventing gastric irritation; this modification has been introduced into the formula (*Bull. de thérap.*, t. XIII., nov., 1836).

Langier has praised the employment of essence of turpentine in the form of a collyrium in certain ophthalmias and blepharophthalmias. These trials, repeated by other surgeons, have not always produced as satisfactory results. Such collyria, however, may be useful in all cases where irritant and substitutive topical treatment is desired.

Amenorrhœa.—Dr. Elliotson, of London, has treated some cases of obstinate amenorrhœa successfully with oil of turpentine in injection. This substance seemed to him to possess a marked emmenagogue property, but he does not consider it infallible. His method is the following:

If the patient is in good health, if the pulse presents resistance, he always begins with a bleeding of from 10 to 12 ounces; then he gives every day the following injection:

℞. Essence of turpentine..... 16 grammes (℥ ss.).
Barley water..... 500 " (1 pint).

In several young girls of sixteen or eighteen, who had suffered from amenorrhœa four months, he restored the menses on the fourth or fifth day (*Bull. de thérap.*, 1836, t. X., 1re liv.).

Erysipelas.—Dr. Girolamo Leopardi recommends the application of essence of turpentine to parts affected with erysipelas, claiming that the efficacy of the treatment has been many times proved in the traumatic form. He adds that he thus cured spontaneous erysipelas. This is a fact to be verified (*Gazette médicale*, 12 octobre, 1872).

The external and surgical use of volatile oil of turpentine and the resin will be set forth in connection with that of some of its derivatives, or other analogous products of the coniferæ, which are only used externally; but we must first speak of tar, not as one of these products, but as usually given internally, and thus connected with the subject we are leaving.

Tar.

Internally, it is chiefly used in *tar-water*. The circumstances do not much differ from those which require the use of turpentine. Tar-water is less potent, less rapid in action, and gives rise to no appreciable physiological effects. It is a very powerful adjunct. Better than turpentine or its essence, it may be given in pulmonary catarrhs, especially when they retain some inflammatory symptoms which might contraindicate pure turpentine, and because tar-water does not cause the physiological irritation of the mucous membranes, which is only useful in those atonic and colliquative bronchorrhœas which we mentioned above. It is certainly one of the best drinks in all mucous and muco-purulent fluxes, especially in those of the tracheo-bronchial membrane, and even in all chronic inflammations of the mucous membranes, whether ulcerative or not; but this relates more particularly to the topical uses, of which we will presently speak. Out-

side of the class of affections which we have named, tar-water is scarcely called for. In all recent works it is recommended for dyspepsia and scorbutic cachexia. It is very certain that it increases the appetite and urine. These properties may be made useful.

An Irish bishop in the last century, George Berkeley, wrote a book in which he gratuitously attributed to tar-water the greatest variety of contradictory virtues. It is sufficient to mention the property of preventing the development of small-pox and all infectious fevers. It seems puerile to discuss before our readers the baseless assertions lavished in this extraordinary book, for we think, with Murray, that the bishop singularly helped to discredit the remedy and to throw into oblivion its real usefulness, by the responsibility which he laid upon it: "Dolendum ob præconia nimia in morbis natura sua valde diversis, ut solet fieri, in desuetudinem abiisse utilissimam medicinam."

Fumigations, liniments, pomades, and injections are often useful methods of giving tar. Fumigations are justly praised in chronic diseases of the larynx, bronchi, and even the lungs, in some cases. The treatment of chronic laryngitis and the various organic lesions which produce it, or are produced by it, finds its most energetic resources among remedies which can be directly applied to the affected parts. The most desirable way of effecting this object is evidently the inspiration of medicated vapors. The experience of others, and our own in particular, pronounces in favor of aromatic vapors; the infusions of the labiatæ for the former, the burning of resinous and balsamic substances for the latter, furnish the best material for disengaging these medical gases.

The liniments and ointments of tar deserve mention in the treatment of some cutaneous affections. Prurigo is one in which they are most used and most useful, according to the following formula: Tar, one part; Sydenham's laudanum, one-eighth part; lard, four parts. Itch, granular tinea, herpes, eczema, especially the two last, for which the physician must have so many remedies at hand, may be benefited by tar in this or any other form. It is recommended by the old authors in leprous affections, the psoriasis of the English physicians and of Biett. Cullen speaks of a very queer way of using tar: "A leg of mutton is roasted, and basted with tar instead of butter, a little bodkin is frequently thrust in to make the juice come out; the mixture of tar and juice which streams down into the dripping-pan is used to anoint the body two or three times in succession in the evening, the patient wearing the same shirt all the time. It is said that this remedy is useful in several kinds of lepra; I have seen it used with much success in ichthyosis, but for obvious reasons I have not had occasion to repeat the treatment."

Without having recourse to the leg of mutton and the dripping-pan (for it was doubtless the singularity of the remedy that deterred Cullen from its use), we may simply add tar to lard as above.

Injections of tar-water are made chiefly into the bladder in chronic catarrh, and it is a remedy which we advise in cases in which turpentine

fails when taken internally. We have often used it with some advantage. When thrown into the fistulous passages which discharge an abundant and fetid suppuration and are kept up by caries or necrosis, into purulent passages which result from deep abscesses which have consumed the interstitial cellular tissue of the muscles, between detached skin and subjacent tissues in certain scrofulous ulcers, etc., these injections are extremely advantageous; and also in the external auditory meatus, if the seat of those interminable otorrhœas which are left by eruptive fevers, especially scarlatina in children.

This brief statement of the cases for the internal and external use of tar-water and tar in substance, with what we have to say of those analogous substances, the resins and balms, must suffice.

Eucalyptus Globulus.

Intermittent fever.—We owe to Ramel the introduction of eucalyptus globulus into France. In 1857 he brought seeds from Australia, and presented them to the Museum and the Société d'Acclimatation. This was the source of the seeds which were furnished to the plantations of Nice, Cannes, Antibes, Algiers, and Spain.

Ramel believed that eucalyptus preserved localities where it was planted from paludal fever, and attributed to this cause the healthfulness of certain parts of Australia. With the same view the English planted eucalyptus in the Cape Colony. The tree absorbs a considerable amount of water, in fact, and charges the air with an essential oil which annihilates putrid fermentations. Stagnant water, into which leaves of eucalyptus have fallen, does not cause fever.

Eucalyptus has been quickly planted in marshy places to exhaust the water, and success has crowned the enterprise (Gubler: "Sur l'Eucalyptus globulus," in *Bulletin de thérapeutique*, 30 août, 1871).

In Algeria the importation of eucalyptus has been very rapid. Trottier, possessing in the suburbs of Algiers a farm where the fever prevailed, planted there, in 1867, 13,000 trees. In the following year, when the trees were only two or three metres high, the fever disappeared, and has not returned since (Gimbert: "Étude de l'influence des plantations d'eucalyptus globulus dans les pays marécageux," in *Bulletin de la Société de médecine de Paris*, 1875).

A farm near Constantinople was covered with marshes in summer and winter, and noted for its insalubrity. Fourteen thousand plants were set out, and in five years the fever disappeared.

Other farms have been improved and made habitable by this process. The same has been done in France in the department of the Var, and in Cuba.

Eucalyptus is also useful in combating the developed fever; Dr. Tristany was one of the first to use it in the treatment of intermittents (*El com-*

pilador, 1865). Soon after, Brunel, a French physician at Montevideo, learning that peasants from Valentia had cured themselves of paludal fever by leaves of eucalyptus, made the trial in 1867, in a hospital which he directed. He gave, twice a day, a cup of an infusion of 8 grammes of leaves in 120 of water (ʒ ii.— ℥ iv.). This was successful in sixteen cases. Since then it has been used in Corsica, Algeria, Spain, Hungary, and America.

Gubler adds the testimony of Carvallo (1866), Malingre (Seville, 1867), and Ahumada (of Aranjuez). He recalls that the corvette "La Favorite," while on a voyage of circumnavigation, lost on board thirty-two men with pernicious fever, and had to put into Botany Bay to discharge the rest of the crew, which was partly affected. These men were treated by the people of the place with infusion of the leaves of Eucalyptus globulus, and recovered (*Bulletin du comice agricole de Toulon*, 1871). Since that time other testimonies have been added in favor of eucalyptus. Regulus Carlotti in Corsica ("L'Eucalyptus globulus," Ajaccio, 1872), Tavera, Abatucci and Susini, Cartau (*Montpellier médical*, 1872), Keller, chief physician to the Austrian Railway Company (*Gazette hebdom.*, 1873), have added the result of their experience. We will add the theses of Gimbert ("Étude sur l'influence des plantations d'eucalyptus dans les pays fiévreux," in *Bulletin de la Société de médecine de Paris*, 1875).

Gimbert has given a table of the observations of Cartau (of Montpellier), Carlotti (of Ajaccio), Tavera, Weller, Lormier, Papillon, Burdel, Kirchberg, and his own, and states as the result, 508 cures and 268 failures among 776 patients.

In looking over the different cases, particularly those of Gimbert, we find many cases favorable to this thesis, but it seems to us very imprudent to announce that eucalyptus is equal and sometimes superior to sulphate of quinia, that veteran which defies all substitutes. We think, while admitting the real action of eucalyptus, that in the interest of the remedy, too much ought not to be promised, for we see that in France, Burdel, who has long practised in a fever-country, has had 112 failures against 12 cures in tertian fevers, and that Dr. Ernst Papillon, médecin-major at the hospital of Mascarra, has not been much more successful.

It is probable that a larger experience of eucalyptus will define its mode of administration better, and increase its success.

Bronchitis.—When bronchitis has passed through a part of its evolution and, after the fever has fallen, has reached the stage of coction, or catarrhal period, eucalyptus has the power of positively lessening expectoration and making it less purulent. It has an action which resembles that of turpentine and tar. This action is perhaps not so powerful as that of the two latter, but eucalyptus has the advantage of being better borne by the stomach, and can be given earlier.

This action on the character of the expectoration chiefly appears in fetid bronchitis, and bronchial dilatation, and we have often tested it at the Bicêtre and the hospital Saint-Antoine. This disinfectant action ex-

ists even when there is pulmonary gangrene, as Bucquoy testifies (Société médicale des hôpitaux, 1875).

Pulmonary phthisis.—Gimbert, who practises at Cannes, where he attends a great many phthisical patients in winter, is pleased with eucalyptus in catarrhal and wholly chronic cases. But he warns against too large doses, as they produce hæmoptysis.

Diseases of the urinary passages.—The odor which the urine assumes when under the influence of essence of eucalyptus has suggested that it might be of the same use as turpentine. The observations of Gimbert are favorable to this view, but eucalyptus is much less active.

External use.—Demarquay, who studied the antiseptics with much care, showed how they might be of value in disinfecting sores. His results have been published in the *Bulletin de thérapeutique* (15 mai, 1872). Delpech thinks that this can be explained by the composition of eucalyptol, which resembles the essential oils and camphor, substances which by a simple action of presence oppose the decomposition of organic matters in putrid fermentation. Demarquay used an alcoholic tincture. This is very well when cavities containing pus are to be cleansed. But when the cicatrization of atonic sores is to be effected, it is preferable to apply the leaves. In these cases, it disinfects the sores, favors cicatrization, and restores appetite and sleep.

Eucalyptus is also used for ozœna, angina, and aphthous and ulcerous stomatitis.

Professor Gubler recommends it in blennorrhagia.

Balsams of Tolu, of Peru, of Mecca; Benzoin, Styrax, etc.

What we have to say relates particularly to all those among the above, which are characterized as balsams by the presence of benzoic acid. The others, including styrax, have either fallen into disuse or are applied to external use. Among the former, balsam of tolu has retained the most credit, and is used in preference to the others.

All these agents, with the understood exception of those which come from the New World, were known to the ancients. Dioscorides speaks much of their internal and external use. The balm of Mecca or Judæa, and myrrh, were the best known to them. They did not restrict their use, as has been said, to the dressing of wounds and ulcers, but used them also for a great many chronic visceral diseases which they compared with ulcers, glandular tumors, fistulæ, external fluxes, and employed them especially for fumigations in amenorrhœa, leucorrhœa, hysteria, all the mucous fluxes, and the catarrhal and nervous chronic diseases of the lungs, as also affections of the larynx producing hoarseness and loss of voice "rancedines et aphoniæ."

The terebinthinates and the balms seem to share the privilege of modifying advantageously the catarrhal and ulcerous diseases of the outer in-

tegument; the former class having a special curative action in affections of this sort located in the genito-urinary mucous membrane, while the second, of which we have to speak, were of particular use in chronic catarrhs and phlegmasiæ of the gastro-pulmonary mucous membrane. That of the respiratory organs in particular presents to the balsams, in the diseases we have designated, the most formal indication and the most successfully filled, in spite of the oblivion to which we have relegated these powerful modifiers; in our own experience, there are very few more powerful agents for the relief of chronic pulmonary catarrh and old phlegmasias of the larynx.

Our opinion is still perfectly in accordance with that of the old practitioners. But we do not claim, as did F. Hoffmann, and Morton in particular, to cure tuberculous phthisis with the balsamics.

When we find the celebrated author of "Phthisiologia," Richard Morton, the countryman and almost contemporary of the Great Sydenham, proclaiming in several places the cure of phthisis (especially the kind he calls scrofulous, or symptomatic of the scrofulous diathesis) by a very methodical treatment by balsamics (in connection with mineral waters and preparations of iron), and in particular by the famous pills which have retained his name, the first idea which occurs is that the physician, deprived of the light which auscultation and pathological anatomy furnish to us, took for phthisis cases of simple catarrh, and especially the purulent catarrh, which may be accompanied by all the rational signs of true tuberculous degeneration. In many of his cures this was doubtless the case. But it is hard to take all his successes from him, since he certainly well knew the causes, the course, the serious prognosis and the organic lesions of tuberculous phthisis. With the exception of the important discoveries of Laennec, there was nothing about phthisis that Morton did not know; he had perfectly well divided the course into the three fundamental periods, which he established upon the degrees of formation, of increase and of softening of the tuberculous matter, etc.; for many autopsies enabled him to describe very exact anatomical facts and peculiarities, which might be called surprising and premature for his age.

Nevertheless this author, so fruitful in general assertions of the virtue of the balsamics in tuberculous phthisis, is not sufficiently so in observations capable of giving authority to his words. The treatise is not deficient in facts. Morton never fails to complete and fortify his descriptions by any detailed and interesting observations, but they leave us quite in doubt as to the efficacy of the treatment. Among all the manifold species of phthisis which he admits, only a few deserve our consideration; for they are the only ones which answer to the present sense of the word phthisis, and are unquestionably tubercular degenerations of the lungs. Thus, we may accept from Morton the five following species, described under these titles:

1. *De phthisi pulmonari originali.*—He thus termed those tuberculous phthises developed in patients free from any general tuberculous diathesis,

not scrofulous, in whom the lungs alone experience the degeneration we speak of, without any other sign of constitutional alteration in relation to this organic state, without any other predisposition than that which seems limited to the pulmonary parenchyma, and makes it the designation of a tuberculous disorganization, under the influence of causes which have no direct and necessary relation with this affection. This species certainly exists in nature, and every one has observed it. It is even the true phthisis, pulmonary phthisis *par excellence*. Several authors cite it in support of the view that pulmonary tubercles are not a manifestation of a scrofulous state, but constitute a disease essentially distinct from the tuberculous affections which are seated in other places. Morton makes less of the balsamics in this case than in the next.

2. *De phthisi scrofulosa.*—This is tuberculous phthisis in persons of similar constitution, affected previously or simultaneously with analogous diseases. He says it is by far the most frequent, and that he has cured more of this sort than of all the others together. He praises the celebrated pills which bear his name, as the chief of the balsamics; their formula is as follows: Benzoic acid obtained by sublimation, 24 grammes (℥ vi.); triturate in a mortar with sulphurated oil of anise, 24 grammes (℥ vi.), incorporate by degrees; powdered wood-lice, ½ kilogramme (1 lb.); gum ammoniac, 64 grammes (℥ ii.); saffron, 4 grammes (℥ i.); balsam of tolu or Peru, 4 grammes. Make pills of 15 or 20 centigrammes (gr. 2¼—3), to be taken to the number of ten daily.

"Istæ pilulæ," he adds, "in scorbuticorum et scrofulosorum lenta phthisi (quæ quidem sunt frequentissimæ phthises), ubi febris (si ulla est) est admodum mitis et exsputum phlegma quadantenus glutinosum, asthmaticorum ritu, curationem non tantum in principio morbi, verum etiam in progressu insigniter promovent."

But he states, as a condition of success, that it must be used long and like a *diet*, that is, one must become habituated to it as to a portion of the daily regimen: "Hujus modi vero remedia copiose deglutienda sunt, adeoque (quantum fieri potest) more dicetæ exhibenda, atque in eorum usu longo tempore persistendum."

It is really much to be regretted that after such fair promises Morton does not see fit to trace the history of some of the patients thus cured. The only observation reported at the end of this chapter is terminated by an autopsy, which showed tubercules of the lungs in all degrees, in spite of the balsamics.

3. The scorbutic species (*phthisis scorbutica*) is also of a tuberculous nature, but complicated with a state of relaxation, abundant sweats, thin and very copious expectoration, especially in the morning; frequent eruptions of the skin, etc.; a state which the old physicians compared with something scorbutic; which explains this expression, so common in their writings and so rare in ours, since we apply it only to a well-marked disease which is rare among us. Morton here praises without stint the virtue of the balsamics, and of five cases which he gives four ended in death;

they were those of a father and three sons, who inherited the disease. The widow of the last of the sons, considered by Morton as tuberculous, survived, and seems to owe her life to a long treatment, chiefly composed of ferruginous drugs. Everything leads us to think that she was only chlorotic, and suffering from a catarrhal cough.

4. He next speaks of asthmatic phthisis, *de phthisi asthmatica*, which is nothing else than a tuberculous phthisis in which, as is so common, the first symptom was dyspnœa, which continued to be the dominant element of the disease. Three observations follow, the first well marked and unmistakable; the patient died notwithstanding the balsamics. The second is like the first. The third was that of a London apothecary, whom Morton characterizes in these terms only: "per plurimos annos in statu phthiseos asthmaticæ (emaciatus scilicet et debilis)." He adds that he was often subject to a peripneumonic fever, depending on "a tuberculous state of the lungs;" but the comparison of the different circumstances of the disease leads us to think that the patient suffered rather with chronic catarrh which at times took the suffocative form, for Morton relieved the attacks by emetics.

5. *Phthisis ab hæmoptoe*, hæmoptoic phthisis, so named because, the symptom hæmoptysis preceding the others, Morton established a relation of cause and effect between them. After repeatedly praising the use of balsamics in the history of this class, he gives three observations terminated by death. The use of this remedy is not even mentioned, and seems not to have made part of the treatment.

The cases of success alleged in the chapter "De phthisi a peripneumonia et pleuritide orta" are without value in the treatment of our true phthisis; for we find there only cases of empyema with pus evacuated by the bronchi, vomicæ passing more or less rapidly from the pleural cavity into the interior of the lung as a result of acute pleurisies. All the other species, of many kinds, described by Morton, must be struck off the list of tuberculous lesions of the lungs. This physician, giving to the word phthisis all its etymological sense, applied it to all chronic diseases with desiccation, marasmus, wasting, hectic fever, colliquative discharges, whatever might be the nature of the organic changes, the general or local morbid states, which kept up the marasmus or consumption. Thus, many chloroses take the name of nervous phthisis (an admirable expression); thus he devotes interesting pages to develop the history of chronic diseases of the liver, under the title "De phthisi icteritia seu hepatica;" that of most chronic phlegmasiæ, hypochondria, etc., however little complicated in their course by thoracic pains, cough, disturbance of the respiratory functions. Morton boldly states that pulmonary phthisis set in and carried off the patient, or that he recovered in spite of that fatal complication. Hence in great part the renown of the balsamics, which he very rarely failed to use in his treatment of these different morbid states.

We must add one thing to explain the difficulty and even the impossibility of drawing any severe conclusions from Morton's practice; this

great physician had the polypharmacic mania quite badly, and professed to use a multitude of drugs in a prodigious number of pathological cases, very often imaginary; finally, his treatment was infinitely composite; in the treatment of phthisis, for example, he insisted much on the importance of mineral waters and iron, which are sufficiently active to make it desirable to attend to their effects and the part they may claim in any treatment. Residence in the country, the strictest attention to observing the six non-natural things, directed as they acted favorably or unfavorably on the state of the patient, etc., formed another essential part of his resources. He seems to us never to have limited himself to the balsamics, which makes all conclusion impossible in regard to these agents.

Morton treated his patients in scrofulous phthisis as scrofulous; those affected with scorbutic phthisis as scorbutics; and this he did with method, constancy, and pertinacity. He modified his treatment according to the seasons; and, in imitation of the fathers of the art, paid the greatest attention to the temperaments, the hereditary circumstances, the pathological habits of his patients, to their ages, and the affections which seemed naturally associated with ages. From this assembly of true and capital considerations he drew his therapeutic indications, and to this he doubtless owed successes which he praised with too much enthusiasm and apparently good faith to allow us to deny them absolutely; and Morton's superiority to us in this respect is perhaps due to our own preoccupation with the points of local diagnosis which pathological anatomy and auscultation reveal; to our concentration of research upon the elements of phthisis which aid little in treatment. We should almost be tempted to call this tendency of our time hurtful, were it not that abuse alone is responsible for the aberrations which legitimate use must and will correct. Let not modern discoveries lead us to despise time-honored principles, but let us add the former to the latter. As regards phthisis, this is the only way to utilize our recent acquisitions. We see how fruitless they have remained for twenty years by themselves.

To return to the balsams. It is clear, from the preceding, that Morton is hardly justified in considering them as curative of pulmonary phthisis, and if need were, we could prove that all those who have thought they could reproduce his assertions and support them from their own experience were little justified. Let us, therefore, erase the balsams from the list of antituberculous remedies; but let us insist more strongly upon their anticatarrhal properties, and be content with that; in this way alone shall we pay them deserved credit.

There is no doubt that true pulmonary phthises are cured, or better, that a good many recover, some permanently, others for a time which may be quite long, during which the health resumes a satisfactory course which may assimilate a radical cure. We can state that we have thus postponed the ending, palliated symptoms, checked the course of phthisis, by the aid of treatment of which the balsams, in different forms, made the basis. In these phthises, in which tuberculous destruction and the catarrhal state

of the bronchi, which is almost always conjoined with it, are not so rapid as to prevent eliminative inflammation from developing around the tuberculous masses and the caverns; in which softening is accomplished without hectic fever, pains in the side, heat of the thorax, thirst or agitation; in these cases we may, by the aid of balsamics, suspend or alternate this purulent discharge and catarrhal condition, and perhaps even (we are inclined to think it) may, from our own experience, favor or hasten the cicatrization of some caverns; but we will not answer for the destruction of a diathesis which, having presided at the formation of a hundred little tubercular masses, will almost surely continue to develop them by thousands.

We therefore consider the balsams only as precious means of momentarily retarding the progress of tubercular degeneration, and, consequently, of preserving the strength and prolonging the life which are so quickly undermined when the accidental deposits in the lung run through their successive periods without check. If we can hope to act on this famous diathesis at the same time that we act on the disorganized lung-parenchyma, it is by a series and a combination of hygienic and pharmaceutic means applied perseveringly and opportunely.

It is needless to repeat, in regard to the balsamics and their certain advantages in subacute and chronic pulmonary catarrh, what we said under turpentine and tar-water. The former, having a less irritating action than turpentine, are indicated in many cases in which we spoke of the use of resins as premature and dangerous. They may be profitably used when an acute state exists, for we have seen cut short (for example, by syrup of tolu) intense bronchitis at the end of the first week, which doubtless would have gone on four or six weeks, as is so common, if it had not been for the aid of this precious remedy. In the case of children, for whom acute pulmonary catarrh is as much more dangerous than for adults, syrup of tolu has often been of immense advantage to us, almost at the beginning of the affection, or rather, when the state of irritation, dryness and turgescence of the mucous membranes, is relieved, and the catarrhal secretion is poured forth, and especially when it persists without fever after the administration of the emeto-cathartics.

The old physicians, who, applying balsamic substances to external ulcers, proved their cicatrizing and *sarcotic* properties, that is, their power to aid in restoring new flesh and tissue, transferred this property to the cicatrization of the ulcers of the pulmonary mucous membrane, because they were ignorant of the rarity of such an anatomical state in that membrane. They confounded the loss of substance produced by tubercle with this ulceration.

The larynx is not exempt, however, like the lung; ulcerations are only too frequent; and in the lungs, they seem frequent in proportion as we approach the larynx. We speak not of tuberculous ulceration of this organ; for since it is almost always a part of pulmonary phthisis, its termination and treatment share the fatality and impotence of those of the

associate disease. But we wish to call attention to the ulcerations of the larynx which follow simple chronic phlegmasia of the organ; and to such phlegmasiæ before they reach the stage of ulceration.

It is in these cases that the general and topical power of the balsamics is placed beyond a doubt by an old and daily experience, which we have shared. Here the local action of the remedies is more efficacious than the general, and we see at once that it is almost impossible to exercise this action otherwise than by charging the air with the balsamic principle. Fumigations, inhalations of vapor emanating from these substances, will therefore be preferred.

We need not give the caution to use the remedy only when the acute stage of the disease has given place to chronic symptoms consisting chiefly in dull pain when the cartilages are pressed, hoarseness or aphonia, slight swelling (sometimes absent) of the hyoid region, whistling respiration, difficult respiration, and in many cases a mere change in the timbre of the voice, with a sensation of pricking and a desire to cough and get rid of some obstacle to speech. But very often the inflammation of the larynx begins with a chronic state, or a series of slight irritations which in time cause profound disorganization of the mucous membrane and the subjacent parts.

The fumigations are made by throwing upon hot coals a quantity of one of the balsams, particularly benzoin, or still better, tolu, and thus filling the space in which the patient is with vapors; or by dissolving a few grammes in boiling water and respiring the vapors, by a bottle with two tubes, one held in the patient's mouth, the other plunged by one end in the liquid and by the other communicating with the atmosphere. We should prefer the former method, because it is less fatiguing, requires less preparation, and particularly because the patient can remain without difficulty for whole days enveloped in a balsamic air. Chronic laryngitis, which has not been benefited by the intermitted application of these vapors, has been repeatedly cured by perseverance in inhaling the air of a room charged with the fumes disengaged by burning various balsams. The effects might be better still if the patients had courage to remain long enough. The fumigations often drive away chronic catarrhs, which were only imperfectly relieved by the use of balsams in other forms. The vapors are concentrated in proportion to the ability of the patient to bear them, and the effects. In smaller doses, they are sometimes useful in pulmonary phthises in the conditions which we have mentioned above, and when the tuberculous discharge and the catarrhal secretion are very abundant and colliquative without inflammation, either acute or subacute, of the surrounding parenchyma.

The balsamic substances of which we are just now treating are very costly, and can hardly be used except by the rich. Patients who fear the expense may replace them by aromatic fumigations with several labiate plants combined, as sage, thyme, rosemary, etc., or still better, tar. The latter product is very often used in the same way.

This is the place to say that the vapors of tar have been much praised in the treatment of pulmonary phthisis. The practice was proposed by Dr. Crichton, and it has rapidly extended in England and Russia.

A pound of tar is made to evaporate by a slow fire in the vicinity of the patient, not boiling, but the empyreumatic vapors should do more harm than good, increasing the cough and difficulty of respiration. Dr. Wall has observed good effects. The physicians of Berlin are convinced of its efficacy in certain cases. Of fifty-four phthisical patients, distributed in four wards in La Charité at Paris, in which a vessel of tar was evaporated four times a day so as to emit thick vapor, four were cured, six distinctly improved, sixteen were not changed, twelve became worse and sixteen died. This treatment is more satisfactory than any that has been applied to phthisis; it is now used at the Berlin Hospital, where several wards are put at its disposal (*Hufeland's Journal*, 1820). But Dr. Forbes (*Revue médicale*, X., 1878) thinks these vapors injurious in true phthisis, and says that they hasten the downward course (Mérat et De Lens). We do not absolutely reject the results of the Berlin physicians, but incline to think we should limit our confidence in them.

If the catarrhal affections of the lung are accompanied by nervous symptoms, especially a dyspnœa disproportioned to the degree of pulmonary lesion, there is a still more positive indication for balsamics which possess a certain antispasmodic action; for further remarks upon which, see Ammoniac.

The internal use of balsams, in the form of syrup or of pills, or better in injection, is likely to be of good service in chronic enteritis, especially that which remains after typhoid fever and dysentery and is kept up by intestinal ulcerations; also those which are observed independently of the pre-existence of these two affections, and at last produce grave, serious ulcerations.

Dysentery.—These complaints are very serious, and to persevere in treatment by antiphlogistics and emollients is often to hasten the patient's ruin. After acute dysentery, when all tenesmus and even diarrhœa are suppressed, we have very often seen that the stools are rather frequent, though moulded, but enveloped in a thick layer of mucus and some streaks of blood. This sort of fæces is also seen in the case of piles. In all these cases, especially the former, we must ascribe sovereign utility to balsams like tolu and styrax given by injection in the dose of 2 or 4 grammes (gr. 30—60) dissolved in boiling water, while syrup of tolu is prescribed in the dose of 16 grammes (℥ i.) in suitable drinks. Hoffmann recommends for this purpose injections prepared with the famous balm of Locatelli, composed of oil of flowers of hypericum, Spanish wine, red sandal-wood, Venice turpentine, and Peruvian balsam.

Lead-colic.—Sydenham had great confidence in the action of the latter substance in painter's colic, but found it powerless in lead palsy. He expresses himself thus: "Hunc dolorem abrosissimum sanat balsæmum Peruvianum frequenter ac in magna dosi exhibitum, nempe, si ejus guttæ

xx., xxx., vel lx. sacchari albissimi cochleari uno instillentur, et bis vel ter in die dentur; ab paralysis huic remedio haud cedit."

Otorrhœa.—We have used advantageously injections of tincture of benzoin or a watery solution of the substance in purulent otorrhœa consecutive to eruptive fevers in children, giving at the same time syrup of tolu. These instillations of balsam into the auditory meatus have been praised in temporary deafness and otalgia.

The balsams may be classed as *nervine* and *cephalic* medicines, and are consequently susceptible of fulfilling certain indications which are explained under the head of the labiate plants, especially melissa (balm).

That which we have said of the external use of turpentine, tar, etc., may excuse us from enlarging upon that of balsams. Storax and balsam of Mecca, are the most used for external application, but have fallen into nearly complete disuse. They are detersive, cicatrizant, good for relieving the excessive pain of wounds; these epithets sum up their surgical value.

Of all the balsams, that of tolu most deserves to be known to physicians. The dose is from 60 centigrammes to 2 or 4 grammes (gr. 9—30—60) in pills or electuary, or suspended in water by means of mucilage. Of the tincture, from 2 to 8 grammes (3 ss.—ii.) is prescribed. One of the most used preparations is syrup, which is a very agreeable addition to a multitude of ptisans, and potions, and may be taken pure. The tablets and pastilles are of common use and repute in colds. All secret remedies for catarrh contain it.

Balsam of Peru is less agreeable, and is given in the same way; and so benzoin. The dose of benzoic acid is half as large.

Copaiva.

Blennorrhagia.—The use of copaiva is almost confined to one disease; and if turpentine is considered the specific remedy for chronic catarrh of the bladder, much more is copaiva that of the urethral canal, and with the additional privilege that it is not contraindicated by even the most acute condition, and may be given at all periods.

To show the destructive effect of the *a priori* arguments, the rules established on the pure reasoning of physiologism, the superficial rationalism of the day upon the progress of therapeutics, we need only point to the ideas of past ages concerning the action of copaiva in blennorrhagia, and the pressing recommendations to use it only in chronic and atonic cases. We should see in what precise terms they proscribed its use during the acute and inflammatory period, based, as they supposed, on the certain danger of exasperating all the symptoms by premature use. They reserved it, in very restricted doses, for the period when nothing remained of the disease but a simple, very thin, whitish mucous flux, and for that which they called a blennorrhœa or gonorrhœa. What followed? Numerous

experiments, mostly due to chance or rashness, showed that in the great majority of cases the administration of copaiva in very large doses and at the beginning of the most intense blennorrhagias, without previous temperant and antiphlogistic treatment, not only increased the disease, but, on the contrary, energetically attacked it and drove it off without inconvenience to the patients in a much shorter space of time than any other remedy.

The neglect of historical study leads certain modern authors to claim persistently the priority in the use of copaiva for urethral catarrh, whereas in the seventeenth century it was used for this purpose by F. Hoffmann, and has never since ceased to be used for mucous flux of the genito-urinary organs and bronchi.

We have only to speak of the use of copaiva in blennorrhagia and leucorrhœa, for that which we have said of the action of turpentine in other catarrhs, that of the bladder and lung especially, being very applicable to copaiva.

Without speaking of the practice and opinions of Hoffmann, Pringle, Fuller Valcareugh, Monro, Labat, Hope, Cullen, the illustrious J. Hunter, Chopart, Swediaur, etc., all of whom entertained, with regard to the medical properties of copaiva and the conditions for its use in discharges from the urethra, the ideas which we just compared with those of the moderns, let us come at once to the date when the question was taken up seriously and experimentally.

In the last years of the past century, Jacquin, to whom we owe (1787) the knowledge and description of the real tree which produces copaiva, gave some details of the bold and empirical way in which certain inhabitants of America used copaiva by injection into the urethra, and particularly the infusion of the leaves of copaifera officinalis internally during the acute period of blennorrhagia. Another traveller, Pison, also reported this practice. At this time the precepts of prudence and restraint, the illusory fears entertained *a priori* in the former method, were thrown aside, and people began to treat recent claps with large doses of copaiba. Dr. Ansiaux, chief physician of the civil hospitals at Liége, and Ribes père, were prominent in proclaiming the superiority of this method.

The former of these first published six cases of rapid and decisive success by Chopart's draught given as he prescribed it (distilled mint-water, brandy, balsam of copaiva, syrup of capillaire, of each 64 grammes (= ℥ ii.), orange-flower water 8 grammes (ʒ ii.). Mix and take two tablespoonfuls in the morning, one at noon, and one in the evening, and continue for twelve days).

This treatment was adopted from the first. In all these observations, Ansiaux proved the coincidence of improvement with the purgative effect of the potion; if the latter was retarded or did not occur, the former came slowly or not at all. Two cases of failure follow; one ascribed to deviation from regimen, drunkenness; the patient cured by certain injections; the other supposed by the author to want of purgative action

on the part of copaiva, which increased the flow. Injections suppressed it this time also.

In 1812 the same author addressed a mémoire to the Athénée de Médecine at Paris. It contains twenty-five observations, twenty-two of which attest the certain and prompt efficacy of this remedy. Of the three other cases, one is noted as not at all affected by treatment, in the second the action of copaiva is disturbed by the abuse of spirituous drink and departure from diet; in the twenty-fifth, the irritation of the urethra and the blennorrhagic flow are much increased by the use of the resinous draught.

This mémoire was the object of a favorable report to the Athénée de Médecine by Fizeau, who said he had used copaiva according to Ansiaux's plan and with equal success. Cullerier (the uncle) also praised it, citing more cases of failure than the author or reporter.

"I have," says Ansiaux, "seen this treatment increase the irritation and pain, when the blennorrhagia was very intense; I have seen it in persons of a nervous constitution cause vertigo. But in those cases it sufficed to suspend or moderate the doses for a few days, and afterward it could be used with success." He does not reckon, among the accidents and contraindications, the fact of colic or diarrhœa; he regards them as indispensable to its efficacy, and, in fact, the therapeutic link, the intermediate phenomenon, on the existence or absence of which the success or failure of copaiva depends; resting on the general principle of Barthez, that "It is necessary to impress upon the forces of nature collective movements which tend toward the distant organs, which are perturbators of the movements which the fluxion affects." Nevertheless he admits "that copaiva does not act here like other purgatives."

Ansiaux, as if to fortify his physiological conception of the action of copaiva in blennorrhagia, and to make it in all points conformed to the principles established by Barthez for the application of derivative and revulsive means, mentions a fact which escaped us and all who have written on the use of copaiva, namely, that when the blennorrhagia (as he calls it, the fluxion) is at its height, the balsamic draught no longer has the same advantages, for the flow usually diminishes during the action of the remedy to reappear later with the same force; while subsequently during the chronic period the medicine recovers its radical virtue. This is possible, and we do not deny it; it is a point to be settled by observation. We will only beg those who wish to resolve it thus to give attention to the following remarks:

Blennorrhagia is suppressed by therapeutic agents, especially cubebs and copaiva, with more ease and promptness, and especially with less chance of relapse, when treated nearer its commencement, which is in accord with the observation of Ansiaux, from which it follows that it has had a more rapid and confirmed success at the beginning than at the period of *état* (height). Perhaps, then, if this physician had persevered a longer time in the use of copaiva, at a period when the disease, being more deeply fixed, is rebellious to the action of remedies, while a mucous membrane,

altered in its vitality, has changed its mode of secretion and ought, according to the natural law of the disease, to continue this new mode of secretion for a fixed time until it becomes chronic, perhaps if he had then insisted on the treatment, he would not have exposed himself to the relapses which he observed as soon as he suspended the medicine.

The more easy and sure effect of copaiva in the chronic stage, in gonorrhœa proper, than in the height of the disease, we are forced to disbelieve, both by the facts which we have observed and by the number and unanimity of other facts which testify against the assertion. Who does not know the often invincible tendency of all old catarrhs to relapse, under the slightest influence? The catarrhs of the lung and bladder are identified with the constitution of certain people (so to speak), especially old men, and art has only the privilege of shortening them, again and again.

The chronic flows from the urethra confirm this law. There are gonorrhœas, says Chopart, which must exhaust themselves, and die of old age.

In 1824, chance put Ribes on the way to a treatment much less common and more heroic, not only in blenorrhagia itself at all stages, but in the severe and various symptoms which often follow its suppression.

Ribes was attending a young man affected with blennorrhagia. He gave 20 drops of copaiva to be taken every morning in a glass of ptisan of strawberry-plant and dogs-grass. The patient mistook the direction and swallowed the medicine (1 ounce) in one day. Soon after there was colic and diarrhœa, and a complete and final cessation of the discharge.

As regards the inconvenience of a large dose of copaiva, Ribes gives a case where, taken in the amount of 64 grammes (℥ ii.) in one dose, it caused no trouble, and led to a prompt and solid cure. His facts tend chiefly to show the incomparable efficacy of the remedy in treating the frequent acute and painful symptoms, which may coincide with the complete or incomplete suppression of the discharge. The most common of these metastatic symptoms is the venereal testicle, or "chaude-pisse falling into the scrotum."

It is usual to attack this blennorrhagic orchitis with general bleeding, repeated applications of many leeches to the scrotum and along the vas deferens; some at the same time try to recall the flow by irritating injections, most usually by introducing sounds or bougies into the canal; and when the acute stage is dissipated by these means and only a swelling and induration of the testicle, especially of the epididymis, and origin of the cord remains, it is usual to employ topics, resolvent plasters, long continued suspension of the parts, etc. Ribes, neglecting this successive and classic series of remedies called rational, and convinced that, while by this method patients rapidly escape the acute stage, the indurations and engorgements of the testis or epididymis remain often enough to attest the inadequacy of the treatment in a great many cases, treated these complications by the specific agent which so well cures the principal disease, and gave large doses of copaiva in a very acute double blennorrhagic orchi-

tis. A prompt and evident success followed, and was repeated in so many other cases as to allow him in all prudence to transfer the new treatment to the other metastases of acute blennorrhagia.

Thus, ophthalmia, arthritis, intense bronchitis, acute catarrhs of the bladder, headaches, otalgias, inflammations of the prostate and kidney, chordee, consecutive engorgements of the groin, etc., were treated by him with large doses of copaiva. Very characteristic, even striking observations, sufficient in a word to call the attention and meet the belief of physicians, especially when their source is known, and they are confirmed by other enlightened and honorable men, are cited by Ribes in proof of these assertions.

The general results of this practice in the point of treatment we are now dealing with are important enough to allow a word from himself: "For sixteen years I have not put a poultice or even a suspensory bandage upon patients with the swelled testicle. (Dr. Rossignol, who says he has treated, by copaiva in the dose of 8 grammes in twenty-four hours, more than 300 persons in the inflammatory period, uses no severe diet, and does not even forbid exercise on horseback. See *Annales Cliniques* of the Société de Médecine of Montpellier.)

"At the third or fourth dose of copaiva, the pain and inflammation of the testicle diminish, and the degorgement begins to appear. I have observed this not only in cases following suppressed gonorrhœa, but also in testicular flexion due to all other causes. We have only to continue the use of copaiva for twelve or fifteen days, and we produce resolution of even very considerable engorgements in the testis and epididymis. The first doses always act promptly upon the testis, and the swelling is seen to grow less, but it then seems to remain stationary for some days, when the diminution becomes apparent and very rapid. With copaiva, we are sure of arresting the increase of swelling and of producing disgorgement, which is not always so surely produced by other means. I have seen several cases of venereal testis which resisted the ordinary means, as bleeding, poultices, baths, diet, purges, mercurial inunction, and which yielded, even very rapidly, to copaiva.

"I destroy the gonorrhœa as quickly as possible, because I regard it, like chancres and buboes, as a perpetually fresh source of infection. I continue the use of copaiva for ten or twelve days after the flow is checked, without the gonorrhœa ever returning. Copaiva stops the nightly erections, the pain, and the gonorrhœal inflammation, as well as the ordinary antiphlogistics, and often better. I have observed that, in almost all cases of spontaneous suppression of gonorrhœa a slight discharge is seen in the morning. At the end of the glans and the meatus there is a sort of red aureola, which announces the existence of the kind of gonorrhœal action which copaiva usually drives away. If the balsams do not always completely destroy the discharge, I am sure that, when given in large doses, they have never failed in the accidents due to spontaneous suppression of gonorrhœa, particularly when these accidents are devel-

oped soon after the suppression of the discharge, and the remedy is used at once."

We cannot confirm these statements by our own experience, for, though we have very often found copaiva of use in blennorrhagia, we have never employed it in those special circumstances. But a sufficient number of good authorities have done so to establish it as a remedy which it is not rash to use in suitable cases. Among those who have thus proclaimed its advantages in these complications we will particularly mention Laennec, Bland, of Beaucaire, and Professor Delpech.

In speaking of cubebs, we mentioned the good results which the celebrated surgeon of Montpellier had had in blennorrhagia. He has been equally successful with copaiva. A mass of more than 400 cases forms a foundation to the therapeutic rules and convictions of Delpech upon this point. He proceeded as follows:

If the inflammation was so excessive that there was reason to suspect its propagation to the whole thickness of the walls of the canal and the surrounding cellular tissue, with suppuration and abscess of the perineum, he began with general and local bleedings, according to need, and afterward prescribed copaiva, without necessarily waiting for the very acute stage to pass; just as he used it at first in all cases which were not so intensely inflammatory, *i.e.*, he used it from the first in all blennorrhagias in which the inflammation was within ordinary limits, as is most common.

Delpech, in giving copaiva, by degrees increased it to 8 grammes per day, 4 in the morning (ʒ i.) and 4 at night. When he had reached a curative dose he remained there a week; then, instead of suspending it suddenly, he diminished it insensibly, until he reached the initial dose. His ordinary prescription was:

℞. Mint water,
Orange-flower water,
Balsam of copaiva,
Syrup of lemon,
āā..... 32 grammes (ℨ i.).
Sulphuric acid ..... 4 " (ʒ i.).
Gum tragacanth..... q. s.

M. A spoonful morning and evening.

In the case of vomiting or diarrhœa, in a word, of intolerance on the part of the digestive organs, he added from 8 to 15 drops of laudanum.

At the military hospital of Montpellier copaiva was taken in wine or common ptisan. Delpech often ordered pills of copaiva incorporated with white soap and orris root for stomachs which could not digest it in other forms. He states that which we have often observed, to wit, that the improvement of the first moment is much easier to produce than to maintain; and that after a few days of administration, many patients begin to feel cardialgia, heat of the stomach, want of appetite, difficulty of diges-

tion, even vomiting, and often diarrhœa. Sulphuric acid then seems to him one of the best adjuvants for aiding the digestion of copaiva.

For the purpose of obviating these inconveniences and preventing a useful medicine from falling into discredit, Professor Velpeau, as recommended by Bretonneau, administered it by the rectum. The good results which the Professor obtained with enemata of cubebs in this disease have been spoken of: the effect of copaiva was not less happy.

In a memoir published in 1827, in the *Archives générales de médecine*, in which Velpeau sums up his experience with the two specifics, given by injection, there are thirty cases treated by copaiva, from which we may conclude:

That balsam of copaiva given by the rectum almost invariably lessens blennorhœa in men and women. In many cases it suppresses them completely in four, five, seven or eight days; more frequently it reduces them to one-third or one-half of the amount; as a general rule, after the eighth or tenth injection its action becomes null, unless it has been completely successful. The dose must be gradually raised, beginning at 8 grammes (ʒ ii.) and going to 32 (ʒ i.). It is suspended in the yolk of an egg or any mucilage, acacia, mallows, linseed. If the rectum is very irritable, we add 5 centigrammes of watery extract of opium, and in case of excessive pain of the urethra, painful erections, etc., some centigrammes of camphor are added. The most acute stage does not contraindicate it, and Velpeau has never seen it cause accidents. The enema should be taken in as small a volume as possible, and retained a long time. Care must be taken in injecting not to moisten the sphincters with the contents of the syringe, for the contact of this liquid with the extremity of the rectum causes a painful burning which may very quickly cause the expulsion of the remedy.

We might also speak of a great many other works on copaiva in acute and chronic blenorrhagia; but we should learn nothing additional which is not contained in the works of those whom we have been discussing. They at any rate strongly confirm the results announced in these latter. Besides, copaiva, in blennorrhagia, has now acquired a confirmed reputation. There is no physician who is ignorant of its powers.

For our own part, we have not been without confirmatory experience, but as the results have been the same as those of our authorities, we simply state that it is confirmatory of them in all points except the metastases of clap, in which we have had no experience. This may be said of all the papers we have described in this chapter, excepting that of Ansiaux, in respect to the necessity for a purgative action before the drug acts against clap; and in this we are agreed with Ribes, Delpech, Velpeau, Rossignol, Guillon, and all those who, not having any systematic interest to save from ruin or an embarassing objection, have seen the facts without glasses; all such have been led by observation to desire its tolerance and perfect digestion as a condition favorable to complete and efficient action. Do purgatives succeed as well as resins in catarrhs in gen-

eral? Almost all physicians try to insure tolerance of copaiva by narcotics, astringents, antiemetics. From our denial that copaiva acts by its purgative effect, it does not follow that it only acts when it does not purge. It is then necessary to suppose that it either acts as a quite special purgative, or that its evacuant action does not prevent the development of its anticatarrhal virtue, especially in blennorrhagia.

A very remarkable thing, proved by ourselves and Delpech and Ricord, is the immense distance that separates blennorrhagia in man from that in woman, as respects the effects of copaiva. This substance is as ineffective in women as it is powerful in man, within the limits noted by Delpech and Velpeau; this is especially true of the acute stage of blennorrhagia in women, for in the leucorrhœa which is so like chronic blennorrhagia, copaiva seems to regain its curative power, though to a less degree than in man.

In women, blennorrhagia is not limited to the urethra, but often invades various extents of the mucous membrane of the vulva, vagina, or even the uterus; it is sometimes limited to one of these regions; it may, in a word, attack all separately, or all at once. Here the analogy between the sexes reappears.

If the disease in woman occupies only the urethra, our specific succeeds, while it is mostly impotent when the flow takes its rise in a part or the whole of the vulvo-uterine membrane. This difference is so marked that, when the disease occupies at once the urethra and the vagina or other parts of the genital mucous membrane, and copaiva is given, the latter remain affected after the urethral flow has wholly ceased. In this case we cannot but explain the exceptional and circumscribed effect by the passage of urine carrying with it a certain quantity of copaiva.

Recent trials made at the hôpital Saint-Louis by Hardy, place this theory beyond a doubt. He injected into the vagina of women, who were taking copaiva, their own urine charged with the drug, and the vaginal affection was cured, though previously the urethra alone had been benefited. In the one case, the bladder made the injections of copaivic urine; in the other, medicine, "Ars imitatio naturæ."

When a patient takes copaiva, says Gubler (*Bull. de la Soc. de thérap.*, 1re série, p. xvi.), he passes in the urine a substance coagulable by nitric acid, which has long been taken for albumin. Valentin, Reiss, and others suspected that it might be a resin. But if alcohol is added, the precipitate is redissolved, which demonstrates that it is not albumin. This substance is doubtless a resinous matter, perhaps copaivic acid. Another substance also passes, coagulable with nitric acid and soluble in ether, doubtless a ternary substance. But in treating it with sulphuric acid and bichromate of potassium, sesquioxide of chromium should be obtained, which is not the case here. Gubler concludes that the resin is oxidized, and that the substance in the urine is a more highly oxidized body.

When balsamic substances, essences and resins, are given, that is, bi-

nary and ternary substances, they pursue a different migration in the system.

The essences are eliminated by certain emunctories, that is, the sudoriparous glands and the air-passages. For this reason the breath has an odor of copaiva, and the elimination by the skin produces eruptions, which vary from erythema to vesicles. The resinous substances, ternary and non-volatile, pass by the urine into the state of acids or salts.

A portion of the nuisance attending the use of copaiva may be avoided —that is, the smell of the breath and the eruption—by giving the resin alone, that is, the balm deprived of its essence. This preparation is found ready-made in commerce; the perfumers use the essence as a basis for all the volatile odors, and separate it; they sell the resin perfectly prepared, at two francs the kilogramme. Gubler has used this resin instead of copaiva for several years, and finds it good.

The contraindications for copaiva are chiefly drawn from the state of the digestive tract. It would be imprudent to give it when any portion of the gastro-intestinal surface presents points of phlogosis or irritation. One of the undesirable results, independently of the risk of increasing the disorder of the digestive organs, is the rejection of the drug and consequent loss of effects.

The miliary or erythemoid eruption, the swelling of the testicle, phenomena sometimes observed during the administration of copaiva, are of no weight in the consideration of contraindications. Delpech used to dissipate the latter quickly with a purgative; but it usually ceases of itself in two or three days, without there being a need of discontinuing copaiva, and is never febrile. As to the artificial orchitis, which is much rarer, we need not hesitate, for the continued use of copaiva, far from increasing it, puts an end to it very promptly.

Vesical catarrh.—Dr. Souchier of Romans finds copaiva a specific in chronic vesical catarrh.

The injection of copaiva has been practised by him five times, in the following manner: "I inject a sufficient amount of barley-water to fill the bladder, and withdraw it after a few minutes. I repeated this simple injection to cleanse the cavity as completely as possible, and to aid the direct contact of the remedy. I then injected 60 grammes (℥ ii.) of balsam of copaiva, mixed with an equal quantity of barley-water, and left them in the bladder, and repeated the same on the following day. On the third day the urine flowed naturally, in a larger stream. I succeeded on this day, without trouble or giving pain, in making the injection without a sound. As I made the injection of barley-water tepid (with the addition of a twelfth part of mel rosatum), I was surprised to find that the patient felt a burning impression from the balsam of copaiva, which was nevertheless injected cold. This sensation extended the whole length of the canal, but chiefly to the entire subpubic region, which also opposed the passage of the injection. I wished to know if this was due to a special action of the balsam or to the perversion of sensibility due to the

pathological state. I injected for this purpose, at the same temperature, a mixture of equal parts of water and wine; it produced absolutely the same sensation. This exaggerated sensibility continued at the moment of the last injections, in spite of the rapid progress which the organs made toward the consolidation of a cure."

It is nevertheless just to add that the idea of relieving vesical catarrh by injections of resinous substances belongs to Dupuytren. Independently of pills of Venice turpentine which this surgeon gave internally, he made injections of tar-water into the bladder. We have in our notes the details of several cases which we collected at the Hôtel-Dieu in 1828 and 1829, concerning these sorts of injections.

Dupuytren used to infuse ½ kilogramme of tar overnight in 5 kilogrammes of cold well-water; he had it filtered and warmed before injecting it. The water was yellowish, like boiled orangeade, and smelt very strongly of tar. He passed a large gum-elastic sound into the bladder and injected every morning two large syringefuls. The sound was at once withdrawn, and the patient told not to pass water for a quarter of an hour. At the end of that time the patient passed the water and a considerable quantity of mucus. This mucus diminished more and more on the following days. We have seen vesical catarrhs thus cured in from twelve to fifteen days (*Gazette médicale*, 1837).

Devergie, Senior, has published quite decisive results in the treatment of chronic catarrh of the bladder by injections of copaiva. He suspends the resin in an emulsion of marshmallow or flax-seed. The quantity of copaiva is from 2 to 4 grammes (3 ss.—i.) according to the irritation of the bladder, to a quart of decoction of one of those emollient and mucilaginous plants.

By this treatment, we completely cured one of the worst catarrhs of the bladder that we ever saw.

Copaiva is a useful remedy in the above specified cases, but it fails too often in blennorrhagia. We usually abandon its use after a short time, if, when given at once in a pretty energetic dose, it does not sensibly modify the discharge. From day to day, this resin becomes rarer and less pure, and we attribute to this circumstance the failures which we have experienced for some years past.

When the use of this drug is continued too long, patients sometimes contract dyspepsia, or even gastritis, which is very hard to cure. It is not a simple irritation, of external cause, yielding readily to rest of the digestive organs, but a true special inflammatory diathesis artificially created by the drug, which infects and deteriorates the economy. Patients affected with blennorrhagia who take copaiva a long time grow thin, pale, and very long preserve traces of this sort of intoxication.

Let us not then abuse copaiva; let us use it prudently, and not profess to rank it as a specific which must cure sooner or later. We should know when to use and when to reject it.

To conclude our remarks on blennorrhagia, we cannot too strongly rec-

ommend a graduation of the doses, beginning with 2 or 4 grammes at the most (ʒ ss.—i.), and progressively rising to the curative amount, which rarely exceeds 15 grammes in twenty-four hours (ʒ ss.). It is equally important to persist several days in this dose, and not to give up the treatment until we gradually reach the original point. Relapses are almost certain if we stop when the discharge is suppressed. It is necessary, where we are sure of having obtained an improvement, to pursue the use of the remedy for at least one week.

We will briefly state the advantages ascribed to copaiva in catarrhal affections of other parts.

Pulmonary catarrh.—Bretonneau has turned the injections of copaiva to wonderful profit in the chronic pulmonary catarrh. He owed to this treatment the cure of a case which had long passed for a true phthisis with tuberculous discharge. Dr. Laroche reported in the *North American Medical and Surgical Journal* (1826) some conclusive observations on the chronic catarrh of the chest, in which copaiva produced certain cure. He prescribed 25 drops in an aromatic drink. Hallé, in his edition of Tissot's works, quotes a case of the same disease following rheumatic pleurisy, in which copaiva perfectly succeeded. A multitude of authors, needless to name, have lauded its excellent effects in chronic leucorrhœa. We refer for these indications to our remarks on the other balsams and resins, under Cubebs.

Diseases of external causation, the lesions produced by external violence, must have preceded the spontaneous derangements of the system, the internal affections, those which, so to speak, were developed under the influence of a constitutional internal cause. Surgery preceded medicine. The external use of therapeutic agents preceded their internal use; then the analogy observed between the character, the progress, the termination of certain internal diseases and several of the more obvious external ones which already had a definite treatment led to the application, in the former, of remedies which succeeded in the latter. This, in short, is the medical history of the resinous and balsamic substances.

From the preservation of dead flesh in embalmments, the spirit of comparison led to the application of these substances to the dressing of wounds and ulcers. As they desiccated dead bodies, reduced them to their solid frame, mummified them, they were supposed to dry up in man the secretions, the excessive exhalations, and desiccate the membranes and tissues; hence their desiccative, detersive, antipurulent properties, in wounds or cutaneous ulcers, the cicatrization of which was tardy or prevented by excessive formation of pus.

The balsams and resins having thus been acquired by external therapeutics, it was not hard for analogy to apply them to the cure of internal ulcerations, mucous and purulent secretions on the splanchnic surfaces. The first step was the topical use in the natural form or in fumigations, in cases accessible to such methods, for example, in the mouth, and all the orifices to internal cavities which were covered with mucous membranes.

The eye, the nasal fossæ, the auditory meatus, the vulva, the vagina, the rectum, being successfully treated in those lesions which most resembled those of the skin, from wounds or otherwise, were thus the intermediate channels by which these agents passed into our medical materia, from the surgical; and soon, all the mucous and purulent fluxes of the inner tegument were treated, as those of the outer tegument had been.

The analogy in these cases was so faithful a servant that the balsams and resins were better established in the treatment of the internal, than of the external maladies on which their reputation was first based. The hope of modifying catarrh or ulceration of the mucous membranes by giving these remedies internally could hardly have originated, except in the idea conceived by the ancients that it was possible for those substances to be absorbed and transported to the mucous membranes by the way of the circulation, and afterwards in the thought that, thus placed in contact with these diseased tissues, they would act on them as they did when placed directly upon points accessible to topical treatment. The ancients very well understood the method of action of the balsams and resins in the treatment of ulcerations, suppurations, external catarrhs, which they dressed or touched with these topics.

It must be admitted that they were guided in their extension of the remedies from external to internal use, by the opinion which we have established of the mode of action of these remedies when taken inwardly, to wit, that, when mixed with the blood, and then with the fluids exhaled by the mucous membranes or deposited upon them (as the urine in the case of its excretory organs), these agents occasion an irritative modification which substitutes itself, so to speak, for the morbid irritation, or bring back chronic catarrh to an artificial acute state which suspends the pathological secretion, and soon rapidly passes off.

This view was held by most of the ancient pathologists, though none of them used these terms to state it. It successively stamped itself on their theories of the intimate action of remedies, on the chemical composition which they attributed to them, and the influences and combinations which they thought were taking place between their elements, and those of the humors and solids; but at the bottom of the result the idea is the same.

We have now to ask if it would not be legitimate and reasonable to turn about the analogical induction of the ancients, and to seek to learn, by experience, to what point it is possible to change, by the internal use of balsams and resins, the state of suppurating surfaces other than mucous membranes; to moderate or suspend the purulent secretion of all the pyogenic tissues and surfaces accidentally developed by the inflammatory process, and which exhale too much pus. We think such attempts would be neither rash nor unworthy of attention.

It is certain that the resinous and balsamic substances, applied directly to mucous membranes which discharge too much mucus, muco-pus, or pus, modify the membranes and bring them back to a normal secretion.

It is equally incontestable that, when taken inwardly and applied indirectly to these mucous membranes in the same morbid conditions, these remedies produce identical therapeutic effects, very probably according to the same mode of action as in the former case.

But it is also observed that the direct application of these remedies exercises an antisuppurative influence upon the surfaces of solutions of continuity in the limbs or trunk, which furnish a bad or excessive discharge, and do not tend to prompt and laudable cicatrization, whether these solutions of continuity have been caused by art or accident, and whether their formation was spontaneous, as in ulcers properly so called. There are analogous advantages in direct applications, made by injection, or by the introduction of wicking or pieces of charpie covered with it into fistulous passages, blind openings, emptied abscesses; the walls of which, organized as it were like mucous membranes, incessantly produce pus or are too unhealthy, too destitute of the conditions necessary to good adhesive inflammation and cicatrization.

In such circumstances, why will not resins and balsams, taken internally and applied indirectly to all these affected parts, modify them, as when applied locally—after the analogy of catarrhal affections of the mucous membranes?

We admit that the substances in question exercise a special physiological and therapeutical action on the mucous membranes, and especially on those of the urinary passages; and we have tried to ascertain the reason. But this influence, though certainly more marked in the case of those tissues, does not affect them exclusively. The cutaneous eruptions, the headaches, the pains which, accompanied by a sense of heat, invade the limbs and the track of nerves, etc., speak clearly of an action which is general, though more concentrated on the mucous membrane and afterward on the cutaneous surface.

The fact that resins, taken internally, produce certain cutaneous eruptions is another argument in favor of our opinion upon the therapeutic mode of action of these substances. These artificial cutaneous eruptions greatly resemble, and are very often identical with, those which are produced by the direct application of the resins and the plasters containing them to the skin.

The agents which we are studying might perhaps deserve to be used in certain cases of general purulent infection and tendency to numerous suppurations, disseminate and indefinite. There are persons who suppurate at the slightest cause; they are commonly called "venomous" [*quasi* poisonous-fleshed], and under the influence of the slightest wound or bruise have a series of little boils which suppurate almost at once, a fact which we have specially remarked in the fingers. When the first point of suppuration is established, there is in these subjects a desperate tendency to interminable reproduction, to general diffusion of these suppurating points; and if, during this tendency, they are seized with some phlegmasia of the parenchyma or the serous membranes, these affections are in danger of

ending rapidly by suppuration. Issues, and all artificial suppurations for derivative ends, may be the source of this pyogenic diathesis.

In other persons, especially in spring-time, a succession of furuncles and non-malignant carbuncles come spontaneously in endless crops on the cheeks, nucha, dorsal region, thighs and limbs; and we all know how painful these affections are, how hard it is to reach and destroy the cause, especially as the effect in turn becomes a cause.

We repeat it, the use of resins seems to us susceptible of being turned to advantage in these circumstances as well as in that which is to-day called purulent absorption, which, originating from a vast focus of suppuration, fill the entire system with pus, sowing innumerable abscesses and infiltrations of pus in the parenchyma, lungs, liver, spleen, and brain in particular. We will say the same of accidental or spontaneous phlebitis which, according to somewhat iatromechanical theories, are accompanied by the same results. A great many remedies have been used in these grave alterations, which are surely less legitimate by analogy than those to the experiments upon which we are calling the attention of physicians. These are, it is true, mere conjectures; but they are not rash, and as their value may be safely judged by experience, we have not thought it unfit to propose them.

In tuberculous phthisis of the lungs the abscesses and suppurations do not form the entire disease. There is a principle behind them, which is incessantly renewed; and if the resins and balsams are capable of attenuating these suppurations, of aiding the cicatrization of the caverns, of moderating the purulent and catarrhal expectoration which causes such rapid colliquation, it is to be feared that the stimulus they impart to the lung may increase the activity of the tuberculous secretion which is the cause of all these consecutive changes.

We think, with the illustrious author of the "Examen des doctrines," that irritation is a potent factor in the deposit of tuberculous matter in the tissues of persons predisposed to this vice of nutrition. These remedies must therefore only be used in the circumstances which we have indicated. But we must add that the balsams, and tar-water, can be used with profit in a very large number of tuberculous phthises, and that what precedes relates chiefly to resinous substances.

It is very singular that the majority of authors on materia medica, while attributing to the resins the effect of suppressing the mucus and purulent fluxes of the internal integument, profess that in pulmonary catarrh, for example, the action of balsamic substances was different; that instead of drying up the bronchial secretion it aided it, and was then useful after the manner of expectorants. We think this distinction should not be made; and that the balsams, though they are less active and irritant than the resins, are nevertheless susceptible of assimilation to them in respect to their mode of influence. These authors contradict themselves, though neglecting to establish this distinction between the manner of action of resins and balsams, when they recommend the latter as

substitutes for the former in leucorrhœa, gonorrhœa, muco-purulent fluxes of the ears, and the dressing of wounds.

The balsams are at once resinous and aromatic. By the former of these properties they resemble the resins, and some of their therapeutic effects are identical with those of the latter substance. By the latter, they have an analogy with the labiatæ, etc., several of the medicinal virtues of which they reproduce, as the sudorific and the expectorant. This distinction, as we see, puts in agreement two apparently contradictory opinions.

Sulphur.

Sulphur has possessed, and still enjoys, a somewhat usurped reputation in the treatment of all dartres indiscriminately. We will not absolutely deny to it the possession of these virtues, but experience has shown that sulphur is not really useful, except in a small number of chronic diseases of the skin. Various sulphurated ointments are sometimes useful in moist dartres, but in the dry forms these remedies are almost always powerless. For itch, however, there is no better remedy than sulphur.

Itch.—The use of sulphur in this affection was suggested by the fact that those who work in extracting or purifying sulphur, or in reducing metals of which the ores contain much sulphur, rapidly recovered from the itch, if they had it before beginning the trade, and did not contract it after once entering the employment. Ointments made with flowers of brimstone, or simply sulphur and lard, suffice, in most cases, to cure the itch rapidly. Chaussier, and after him Brachet of Lyons, substitute for the ointments the flowers of sulphur, which they simply throw into the bed of the patient every evening before it is occupied; three or four weeks suffice to cure the disease. But the alkaline sulphides are chiefly used; in sulphurous baths given for fifteen or twenty days, or in friction with the liniment of Pihorel, in the palms of the hands, or in the much speedier method which is generally used to-day in the Hôpital Saint-Louis and the Children's Hospital at Paris. The method is the following. We do not refer it to any one author, as its invention is disputed.

Hebra of Vienna, Bourguignon, Bazin of the Saint-Louis Hospital, and Legrand and Auguste Millot, physicians at Mellot (Oise), have very particularly insisted on the mode of administration of sulphur in itch, as this mode constitutes, in a sense, the treatment. The formula of Legrand and Millot consists of a mixture of 125 grammes of lard (℥ iv.), 15 grammes of flowers of sulphur (℥ ss.), and 5 grammes of sea-salt (gr. 75). The patient takes an alkaline bath the day before, and in the morning after the bath begins frictions, repeated every six hours, with one-fourth of the quantity of ointment above noted. It is important that the friction should be made upon all parts of the body. Next day, by way of additional precaution, a bath is taken, and the garments previously worn are put into an oven to destroy the acari and their eggs if they remain. One day of treatment then suffices.

Bazin's treatment, based on the same principle, that of a vigorous application to the entire body, differs from that of Legrand and Millot only in the nature of the sulphurous compound. Bazin uses the sulphuro-alkaline ointment of Helmerich:

℞. Sublimed sulphur.....	200	grammes	(gr. 3,000).
Subcarbonate of potassium..	100	"	(gr. 1,500).
Lard.....	800	"	(gr. 12,000).

M.

At the Children's Hospital, Paris, we pursued, with entire success, the method adopted by our colleague of the Hôpital Saint-Louis; the general frictions are performed two days successively; on the third day a sulphur-bath is given, and on the fourth we discharge the patient after a second sulphur-bath in the morning. For additional precaution, we let the patients take away about an ounce of flowers of sulphur, of which they must spread in their bed every night about half a teaspoonful.

Hardy has very successfully altered the treatment given above; very numerous experiments made by him at the Hôpital Saint-Louis prove peremptorily that two hours of treatment suffice. As soon as the patient comes in, his whole body is rubbed with black soap. The friction lasts twenty or thirty minutes; he is then plunged into an alkaline bath for an hour. On leaving the bath, his whole body is again rubbed with Helmerich's ointment, and the treatment is at an end. The ulcerations, papules, and pustules which may accompany the itch are not cured in an instant; but the itch is cured, so far at least as that the acarus is destroyed, and that what remains is only an accidental and non-contagious malady.

Sulphurous acid.—The suffocating odor of this substance, which causes all others to disappear for a moment, led to the belief that the acid possessed disinfecting virtues; it has, therefore, perhaps from remotest antiquity, been used to prevent and arrest epidemic and contagious diseases. In the great epidemics of the plague, sulphur was formerly burnt with as much confidence and good faith as hydrochloric acid was disengaged at the end of the last century, and as in our time chlorides are sent abroad.

The fumigation with sulphurous acid in cutaneous diseases was indicated by the famous Glauber, Lallonette, and Franck, but Galès and Arcet *père* deserve the credit of reviving this treatment, which, at first in the Hôpital Saint-Louis, and afterward in the whole of Europe, has been adopted in the treatment of itch and many vesicular and pustular dartres.

The whole body of the patient, except his head, or only the limb which is to be treated, is enclosed in a box which receives the sulphurous acid, produced by the combustion of sulphur in the interior of said apparatus or in a box from which it is led by a tube.

These fumigations are not only used in dartre and itch, but also in non-febrile rheumatism, diseases of the bones, scrofula, paraplegia, sciatic neuralgia, etc.

Sulphuric acid.—The hæmostatic and temperant powers of this acid need not be mentioned here.

Hydrosulphuric acid.—This is one of the most active principles of the sulphurous mineral waters. As a gas, it is one of the most violent poisons; mingled with the air in the proportion of one fifteen-hundredth, it is able to kill a small bird, according to the experiment of Thénard and Dupuytren; one eight-hundredth will kill a dog, one two-hundred-and-fiftieth, a horse. Injected into the veins or serous cavities, it is eliminated promptly through the lungs, and is much less dangerous.

Sulphide of calcium.—This used externally like flowers of sulphur. It enters into the composition of the antipsoric and antidartrous ointments, in the dose of 2—4 grammes to 30—50 of lard (ʒ ss.—i.; ʒ viii.—xii.). Mixed with oil, it forms the famous powder of Pihorel, so much used for itch. A little powdered sulphide of lime was mixed with oil, and this liniment was rubbed upon the palms of the hands twice a day. Pihorel regarded this as the most effective treatment of itch. Internally, it has been recommended for mercurial salivation in the dose of 1—5 decigrammes (gr. 1½—7½) several times a day. Bush of Strasburg, at the beginning of this century, recommended it in pulmonary phthisis; he mixed it with equal parts of extract of aconite, and gave this remedy in doses never exceeding 1 or 2 grammes. Harel of Tancrel has recently published a little work on this subject, in which he reports several cases of phthisis cured by this mixture of aconite and sulphide of calcium. We have every reason to believe in his veracity, but we are convinced that he has made some mistakes, and taken severe catarrhs for tuberculous phthisis. Still, it is an important fact, that chronic catarrh may be successfully treated by sulphide of lime.

Sulphydrate of sulphide of calcium is still used as an epilatory. Its action is very prompt, and irritates the skin hardly more than the razor.

Sulphide of potassium.—This is a very energetic and extremely irritant poison. Applied to the skin and the mucous membrane, it acts as a slight caustic, in which respect it is very like potassa, soda, and lime; it should not be prescribed internally except with extreme care, and mixed with substances which attenuate its action, and dissolved in a large quantity of liquid.

Internally, it has been given in the dose of 1—3 decigrammes dissolved in 250 grammes of distilled water with sugar and aromatics (gr. 1½—4½; Oss.); or incorporated with simple syrup so that each teaspoonful contains 3 decigrammes (gr. 4½) of sulphide. Bayet associates it with cacao butter and oil of sweet almonds, and thus forms a soap which loses its causticity while retaining the general properties of sulphur.

Externally, sulphide of potassium is one of the most common of remedies. It is used in artificial sulphur-baths, upon which we shall delay a few moments.

When these baths are ordered, it is usual to prescribe 100 grammes of sulphide of potassium dissolved in a quantity of water sufficient for a full

bath. Sulphur-baths, prepared according to the doses and with the proportions which we have given, are really artificial sulphur mineral-waters, excepting some unimportant ingredients. It is, however, well to observe that the mineral-waters have as a base hydrosulphate of sodium, not of potassium.

In the sulphur-baths two things are to be remembered; the dose of the chief mineral, and the temperature of the bath. The sulphide of potassium or sodium dissolved in water, even at a moderate temperature, causes acute irritation of the skin, which may be extreme if the amount of sulphide is very great; this excitement reacts upon the whole system, giving rise to an artificial fever, to insomnia, and certain irritable persons are obliged to suspend the use of it, or at least to place a long interval between the baths; if the temperature is equal to that of the blood (higher than that of the skin), and the bath gives heat to the body, the excitement is still greater. These baths are often given for the purpose of causing an artificial fever, and as, at the same time, the active excitant of the skin calls the blood and the crises into the cutaneous organ, we may understand how useful such baths may be in chronic internal affections, especially such as are connected with a humoral vice, as dartres, scrofula, rheumatism, etc. The most favorable conditions for recovery are thus fulfilled; solicitation of a fever of coction, direction of the critical elimination to the skin.

The existence of an actual febrile state is, of course, a contraindication for sulphur-baths, for it endangers the production of the inflammatory orgasm, and arouses or increases sleeping visceral phlegmasias, thus encouraging a critical fluxion to organs already in fluxion, which is the worst of conditions.

It is necessary, then, that the febrile state should never have existed, or at least, that it should have long passed away.

Sulphur-baths are also contraindicated in hæmorrhages accompanied by an evident fluxionary and febrile state.

Still, we can see what service they must render in chronic non-febrile rheumatisms, in atonic wandering gout, in external scrofula, dartres, chronic non-febrile mucous flux, and superficial phlegmasias of the mucous membranes. This is in fact the class of diseases in which experience has most clearly shown the value of sulphur-baths, and the natural mineral-waters perform cures which in the eyes of many border on the miraculous.

The influence of sulphur-baths is such that in provoking an artificial fever they at the same time cause a critical fluxion to the skin. This critical phenomenon is manifested, not only by sweats, but by what is called *la poussée*. The *poussée*, in the language of the physician of the thermal spring, is an active fluxion to the skin, manifested by small papules, and often a painful, confluent vesicular eruption. In certain persons the rash is easily brought out, but in others the duration and the temperature of the baths must be increased. In certain natural thermal waters, the patient takes six or eight hours of baths, and the temperature is raised to 40 or 41 degrees.

When this phenomenon cannot be obtained by baths of two or three hours, of a temperature not exceeding 30 degrees (86° F.) it is rash to solicit it by baths as long and as hot as those we have mentioned; very severe trouble may result, and the patient is very often the victim of the blind empiricism of certain physicians, who, without regarding antecedent diseases, or the inflammatory or fluxionary tendencies of those entrusted to their charge; without thinking of contraindications furnished by their original constitution (accidental or acquired), submit all patients indiscriminately to the same treatment. It is the part of a prudent man to abandon the attempt to procure the critical cutaneous fluxion by general baths, when it is tarry in appearing; but what it is imprudent to attempt by baths may more easily be obtained by douches. The action of the douche is, in fact, essentially different from that of the bath.

The bath lasts a considerable time, during which the heat formed in the system accumulates without the power to disperse, as the cutaneous secretion, that great means of refrigeration, is interrupted, and the water gives rather than takes heat. The result is an artificial plethora, further increased by the absorption of water through all the venous radicles of the outer tegument. To this first cause of excitation we must add that of the irritant agent dissolved in the water of the bath. If you desired only the local irritant effect upon the skin and the transient febrile orgasm which it causes, the bath has done, or may do, too much.

The douche, on the contrary, which lasts only a few minutes, and strikes only a limited portion of the surface of the body, does not give rise to this plethora, though it may cause as much or more excitation of the skin, since the temperature may be raised until it becomes unbearable; hence, we may graduate at will the cutaneous excitation and the reactional fever.

For this reason, every physician who wishes to obtain the rash, and does not obtain it by moderately long and hot sulphurous baths, should immediately use the douche.

In general, purely local diseases ought to be attacked with douches rather than baths. In a disease limited to a joint, in glandular engorgement, the action of the douche near the affected part should be preferred, unless the local lesion is in some sort the mere manifestation of a diathesis such as rheumatism or scrofula, in which case we should make concurrent use of general baths and douches.

Although sulphur-baths certainly exercise an action upon the system which is directly opposed to that of cold baths, it is certain also, that in some medical constitutions sulphur-baths cure St. Vitus's dance, which is generally so much benefited by the cold plunge. We say, in certain medical constitutions, for Baudelocque and Bonneau, physicians at the Hospital for Children, found that from 1831 to 1839 they were forced to change their treatment of chorea, which, at first rapidly cured by cold water, required, some years later, sulphur-baths, while these baths afterward became inefficacious, and were replaced with advantage by prepara-

tions of iron. The rheumatismal nature of many choreas also explains the good effects of sulphur-baths.

These same baths were recommended by Brett in the treatment of lead palsy, and Tanquerel des Planches attests their utility in this case.

Sulphurous lotions are daily used for dartres of the face, for injections into the ears or vagina, in cases of mucous or purulent discharge.

Sulphide of potassium, like the sulphide of sodium, is added to fats to form ointments which have the same therapeutic action as those made with sulphur.

Sulphites and Hyposulphites.

External use.—The sulphites were first used as antiseptics for the treatment of wounds by Burgræve of Ghent (*Académie de médecine de Belgique*, 1862, p. 342). This surgeon found that the first effect of the sulphites was to put an end to hyperæsthesia of wounds, and make them so insensible that the finger could be passed over them without giving pain. The pus is scanty, tenacious, and odorless. We have confirmed all these facts. The disinfectant has no color or smell by itself. Other surgeons, Forrini of Tunis, Taggiuri, and Gritti, have obtained the same results as Burgræve and we have.

Purulent infection.—Whatever we may think of Polli's theory, the clinic is the only final judge, Taggiuri, Capparelli, De Ricci, Mirone, Rodolfo Rodolfi, state that the sulphites lessen the purulent fever and the chills; Mazzolini, Ademollo, and Remolo Granara, ascertained it later; and Semmola, while he declared that the sulphites do not cure purulent infection, cannot deny their action upon the access of symptomatic intermittent fever.

Putrid infection.—The action of the sulphites is very doubtful here, in spite of the favorable observations of Capparelli, but Spencer-Wells has found them serviceable.

Puerperal metritis, puerperal fever, puerperal putrid infection.—Capparelli, Lombroso, and Rodolfo Rodolfi, state that though the sulphites do not arrest puerperal fever, they put an end to the chills, like sulphate of quinia.

We shall not profess to cure puerperal fever with the sulphites, but they perfectly supply a more modest demand.

When a woman is confined, the lochial discharge takes an odor of putrid fermentation on the second or third day after delivery, especially if she does not suckle the child. In this case we soak the patient's napkins with a five per cent. solution of hyposulphite of sodium, adding, if necessary, vaginal injections of the same solution; and we thus destroy the odor of the lochia, and even prevent their production. This is not only a toilet precaution, but a hygienic measure which we regard as important.

Intermittent fever.—Hundreds of cases have been treated in Italy by the sulphites. Mazzolini mentions 336 cures in 403 cases, or 81·46 per cent.

We have not been able to compare the results at Paris, where the intermittent fever is only exceptional; but we suspect, in spite of the enthusiasm of the Italians, that the sulphites are not destined to overthrow the sulphate of quinia.

Infectious diseases.—Typhoid fever, erysipelas, sweating fever, have been very often treated in Italy with various results, which we have not been able to obtain; but we have used hyposulphite of sodium with success in injections for dysentery. Under its use, putrid fermentation was delayed, or did not appear in the stools. This practice enabled us to treat, during the war, some dysenteric patients in one ward without the production of infection in other patients. For further details, see the memoir published by one of us (C. Paul: "De l'action physiologique et thérapeutique des sulfites et des hyposulfites," *Bulletin de thérapeutique*, 1865).

EXCITANT TREATMENT IN GENERAL.

In estimating the indications for excitants, it is essential to understand their mode of action, independently of their therapeutic effects.

By the term "excitant," or better, "pyretogenetic," we understand any agent capable of exciting a form of fever characterized by an excess of energy in the impulse of the heart and in the frequency of its beats, by increase of the heat of the skin, and by the numerous modifications of the intimate phenomena of nutrition which ordinarily accompany that which, in pathological language, it is agreed to call "ephemeral inflammatory fever."

We have not characterized this form of fever by the too vague expressions, "exaltation of the vital faculties," because this exaltation is observed only in certain apparatus; and because, in every deviation from the physiological order, by exciting, or depressing, or perverting, the trouble is always felt unequally.

However well we manage the excitation, we never obtain (for example) an increase in the functions of the kidneys, skin and digestive membrane at once. To take the most simple example, if we suppose for a moment that the body is so chilled as to give rise to a sensation of general discomfort, while the functions of the skin, the muscles, and the genital organs are diminished, those of the kidneys and mucous membranes will be increased; in this case a gradual warming at a fire will bring everything back to the normal point, which implies increase of some functions and diminution of others.

If we now continue to apply heat (the type of excitants) to the body, we shall again reach an abnormal state precisely the opposite to that whence we set out; the action of the heart will be increased, the secretions of the skin exaggerated, while those of the kidneys and mucous membranes will be equally diminished.

It is wrong to take the excitation of one general apparatus for a general excitation.

All the excitants so act on the nervous system as to increase its influence over the apparatus which it governs. This is so at first; and it is true that all the functions, general and special, are for a moment exalted together, first the animal, next the organic. We shall see hereafter the

inferences to be drawn from this. But the phenomena become more complex; the heart, influenced by the nervous system, soon raises the system to the tone of fever, and this makes a perturbation, and an unequal distribution of the circulation, as we just said. The blood, coming in greater quantity to the nervous masses, there produces functional troubles allied to plethora, which are no more an exaggeration of the physiological acts of the brain and cord than indigestion is an exaggeration of digestion. We have, then, under the influence of excitants, first, an almost simultaneous but transient increase in all the functions, and afterward, angiotenic fever with all its consequences.

All the question of excitant medication is reduced to the appreciation of the circumstances in which it is desirable to stimulate the nervous system and to excite the vascular or angiotenic fever.

At the appearance of our first edition this was a burning question; the doctrine of the Val-de-Grâce was so predominant in all medical theories, it was so infiltrated into the mind of those who resisted it the most obstinately, it had been propagated and preached with so much enthusiasm and conviction, that all the traditions of our ancestors had been forgotten, and it seemed almost a strange thing to try to recall one of the pathological and therapeutical laws which were once current.

We are very reluctant to use new expressions, especially when we are not putting new ideas in circulation; but the words, by the abuse which has been made of them, are turned from their primary sense, and by degrees have ceased to represent the original ideas; hence the necessity of speaking differently, though we think as before.

"Life," says Brown, "is kept up only by stimulants." This proposition seems so true, that at this day it is almost axiomatic. We dare not say that the food is only a stimulus, that the sperma, in contact with the ovule, is only a stimulus, that the impression, in contact with the brain and the nervous ganglia, is only a stimulus.

Food, light, odorous effluvia, are general stimuli, but they are also causes of special action to the stomach, the eye, the olfactory membrane. The action itself belongs to the living tissue endowed with a certain organization. It is not with organized as with brute matter; the latter can only act under an extrinsic impulse, which really and essentially becomes a cause of movement; but organized matter is endowed with spontaneity, and the extrinsic impressions it receives are only the occasion, not the essential cause, of the movement.

We may justly regard the impulsion as the cause of the movement of a billiard-ball; we may properly consider gravitation and attraction as the cause of the harmonic movements of the universe, since cause and effect can be submitted to rigorous calculation. The movable body being represented by 1, and the impulse by 10, we shall have a result more considerable than if the impulse equalled 5, or if the movable body equalled 2. The relation of causality is here perfect. But 1, 10, 30, 100 of light applied to the eye will not make the eye more energetic in proportion to the

quantity of light. 1 of light will blind the man who comes from a cavern; 100 will not suffice him who has just crossed mountains covered with snow, under a brilliant sun. If, then, light were the cause of vision, we might calculate vision as we calculate movement, which is impossible. This is what Broussais failed to understand, who, reasoning as if he were speaking of brute matter, faultily changed the terms of the syllogism and substituted the word "organized matter," as if the consequences were necessarily the same. All this will become clear and practical when we sum up the elements of this analysis at the end of the chapter.

This way of regarding organized matter in its relations to external agents was of a seductive simplicity; this was what blinded Broussais himself and those who followed him in the easy path which he had broken.

We wish to reach the capital point on which this whole chapter is based, to wit, that the power of external agents upon the system must be calculated from the point of view of the spontaneity and specificity of action of our organic elements, at least as much as from the point of view of the nature and intensity of those agents.

Thus, instead of admitting the exclusive principle of Broussais, who, abstracting the organic state, supposed to be always the same, gives the chief rôle to the stimulants, we, on the contrary, assuming life in the tissues, wish to give a leading place to the specific modifications of the vital state, and to accord to the external causes of excitation less importance than has been generally conceded in our days.

Let us, then, suppose man living in possession of all his organs and in a state of perfect equilibrium. He has in himself all his conditions of existence, all his functional aptitudes.

Take another example from the function of sight. The organ of sight being healthy and in the normal conditions for functional use, a pencil of rays applied to the eye will become the occasion and the stimulus of the function. The requisites were, on the one hand, functional aptitude; on the other, normal intensity of occasion. If the light is null, sight cannot be exercised for want of occasion; if excessive, excess prevents the use of sight. Blindness is at the two extremities of the scale, the result of two causes essentially opposed. Let the blood cease suddenly to enter the brain, and the faculty of sensation and motion is abolished; let it, on the contrary, distend the cerebral vessels excessively, the same abolition of faculty occurs. The same functional troubles correspond to two causes diametrically opposed. It is the same with two men, the one of whom, dying of hunger, is delirious because of that fact, while the other, after a feast of rich food and generous wine, is delirious from another cause.

Is it thought that these analogous functional troubles ought to be treated by the same therapeutic means? Certainly not, for while in one case we give sight by lessening the intensity of light, in the other we give it by increasing the mass of luminous pencils. To remedy the same troubles, we use or we remove the excitants, according as they are applied to the organ in too small or too large quantity.

Hitherto we have considered the state of health. Let us now see what changes may arise if the stimulant remains the same and the organic state alone changes.

Suppose the skin of the body at 26° R. (90½° F.): an affusion of water at 28° will give a sense of heat—will excite. But if the skin is at 29°, the same affusion will give an impression of cold—will debilitate. Caloric is, then, only a relative excitant, since it is stimulant or debilitant in virtue of the state in which it finds the system. So for the light, the normal stimulus of the retina. If the eye has long been plunged in deep darkness, objects can be distinguished by the most feeble light; but if for some minutes the eye has received a strong light, that which was formerly sufficient for the exercise of vision will no longer be so. Nevertheless, the stimulus is the same, the state of the organ alone has changed. Take a third case: call the normal stimulus of the human stomach 50; if the person has long used unstimulating food, he will experience sharp irritation when he suddenly takes food represented by 50 on the scale of stimulant power; while if he has accustomed himself to use very exciting food, that which lately stimulated him too much will be now incapable of bringing the stomach to the tone of physiological excitation necessary to the accomplishment of the function.

Is it the same in the pathological order? Brown, whose doctrine was no more purely physiological than that of Broussais, professed that the laws we have stated governed pathology also; Broussais, who called himself a physiologist, simply denied these laws, which are absolutely certain. Broussais did wrong in denying them, Brown did wrong in applying them all to pathology; and, singularly enough, the former, who professed to be building up a doctrine wholly founded on physiology, denied the most common physiological whims, and made physiology only with pathology; while the other, who called himself a pathologist at all risks, made pathology out of physiology alone. A deplorable error, for the sick man is not one with exaggerated functions, but with disturbed functions, which is not the same thing by a great deal. The affected organs doubtless remember the physiological state, but they now obey the laws governing the state of health very imperfectly.

Broussais said: "The more an organ is irritated, the more irritable it is."

Brown said: "The more an organ is incited, the less it is incitable."

Brown was right in the physiological order, as we have superabundantly demonstrated in the examples we have quoted above.

Brown was sometimes right in the pathological order, if the incitation is repeated and remains the same.

Broussais was right in the pathological order. Thus, it is evident that excitants increase the local irritation; this law has not a single exception.

But Brown and Broussais, in uttering an absolute proposition, went beyond the truth; and this is what we shall try to prove.

It is clear that excitants increase excitation, both local and general; let us then regard as perfectly contrary to the rules of sound practice the pathological laws of Brown, who stimulates in all diseases except pneumonia, small-pox, and acute rheumatism. We think, on the contrary, with Broussais, that almost all the phlegmasias ought to be ranged in Brown's category of exceptions, and that the more actively a part is irritated the more it is irritable.

The principle of Broussais is true if we regard the local state only, but false if we consider the general state. From the point of view of exclusive solidism, as Broussais understands it, and from his idea that the fever is always provoked by a local irritation, it is absurd to suppose that the opportunity for excitant treatment could ever occur; but we, who are humoralists when necessary, who believe in the elimination of morbific principles, we also believe that fever is often of some use, and that there are cases in which it ought to be provoked by treatment. When a morbific principle is introduced into the system, as alcohol, it is absorbed by the vessels, and enters into contact with all the tissues, which it modifies in its way; a fever is kindled in proportion to the intensity of the cause and the idiosyncratic susceptibility of the patient. By the pulmonary exhalation, by sweating, by the urine, the alcohol soon escapes from the system, and all resumes order, as soon as the cause of disorder is gone. In this case the fever has had the incontestable utility of multiplying the intimate phenomena of secretion and placing the system in the most favorable conditions for relieving itself from the morbid products which burdened it. To us, as to the Hippocratic school, fever is always a condition of the cure of these patients—the *conditio sina qua non* of morbific coction.

Ridicule has been thrown on this word, "Hippocratic coction," by some of our contemporaries, who very probably do not understand it.

Coction, as we know, was a synonym for digestion, and the Father of Medicine designated the digestion of food and that of morbific principles by the same name. He thought, and we think with him, that the morbific principle, introduced into the system, occasioned a process analogous to that which food introduced into the stomach excites in that organ. The difference between food and the morbific principle is that the former, adapted to man's sustenance, causes only a temporary disturbance which the system easily conquers, while the other, a stranger to the economy, revolts and troubles it, whence comes fever.

The digestion of food is at first in the primæ viæ (the digestive tract) the cause of a local reaction; in the secundæ viæ (the vessels) it becomes the occasion of a general excitation or a fever of digestion, caused by the general excitation which the strangeness of the alimentary fluid causes in all the tissues of the economy; for the various liquids which are drawn by the vessels from the surface of the intestine are not so appropriate to our tissues that they can be at once assimilated. The food in the secundæ viæ, as in the primæ, has to undergo an epuration; and as the fæces are the residue of the first digestion, the urine, sweat, pulmonary perspira-

tion, are the residue of the second. Supposing for a moment that the organic molecules were not influenced by the absorbed alimentary liquids, and that these products remained in the blood and infiltrated into the tissues for whose nutrition they are adapted; all the nutritive phenomena would be arrested, and this state would be incompatible with life. But if the physician, by the aid of the excitants, raises the system to the tone necessary to enable it to respond everywhere to the impression of the digestive fluids, we shall in the bony structure assimilate the salts of lime, the muscles, fibrine, and the different emunctories give passage to all that cannot aid nutrition. In order to bring this phenomenon to pass there was needed a more active excitation, a regular fever.

The same in regard to morbific causes. If a morbid element is introduced into the system, it will penetrate with the blood into all parts, and arouse an action which will be energetic in proportion as its nature is less assimilable and more excitant; this fever, as in the previous case, will place the different emunctories in functional relation with the products to be eliminated, and nature will thus get rid of the morbid causes. The Hippocratic coction of diseases must be understood in exactly this sense.

If the general excitant was too active, if the centres or the nervous conductors of internal life are modified so as not to impart to the organs the influence necessary for accomplishing the eliminative functions, the duty of the physician will be to moderate this excitation by all the means at his command; but if, through the septic nature of the morbific principle, or the treatment, the general excitation is less than it should be, and the ganglionic system which presides over secretion is not stimulated with sufficient energy, the physician will have to arouse the necessary fever by the aid of excitants.

We have reasoned from the hypothesis that the morbific principle has not caused anything but those transient perturbations of the inner activity of the capillary circulation and innervation, which do not amount to inflammation. In this way only could we compare it with food, and apply the principle of Hippocratic coction.

Suppose now that the same morbid principle has acted more especially upon the lungs, constituting a flexion of the chest. Here the cause will be of small importance, while the local effect will occupy a much greater place in the pathology. We believe that in this case also the reactive fever, however energetic it may be, should be considered like those of which we are speaking; that the morbid products formed at a point of irritation and reabsorbed are a cause of fever like the ingestion of a poison—like the morbific principle of which we lately spoke. The whole conduct of medicine is summed up in these terms. Moderate the local fluxion by tempering the intensity of the fever, favor resolution of the effused morbid products and the elimination of the reabsorbed morbid products. Usually, far from exciting the fever, the physician will try to moderate it, for the cause itself is energetic and strongly excitant. And the coction of those morbid products which circulate in such quantities through the

system, impossible or very difficult as it is, will only be assisted by large sanguine or humoral evacuations which will act here as an emetic does in discharging an overloaded stomach.

In this case, however, as in the more simple one, the nervous system may bend, the strength may be insufficient for the digestion of the morbid products and final coction, and it may be necessary to excite the fever in order to get a final elimination of the absorbed morbid products.

It is very rare that the indication for excitants exists at the beginning of acute diseases; the fever in this case is too energetic rather than too feeble; but at the end of the pyrexias and the phlegmasias, when the incitability of all the apparatus is in a way exhausted by the constant exercise of morbid digestion, and by the debilitating treatment, a need for new stimulus occurs in each organic element, like a stomach tired of uniform diet; and the excitants then impart to the cerebro-spinal and the ganglionic nervous system, the power to influence the other organic elements. The general excitants, then, should be used as a rule at the end of acute diseases, when the fever has fallen and resolution is slow. In describing irritant treatment we mentioned the circumstances in which irritant topics, applied to the neighborhood of inflamed parts, increase locally the movement of resolution, as the general excitants aid in the complete assimilation, or at least the complete elimination, of non-assimilable morbid products.

There are, however, acute diseases in which the cause acts with fearful intensity, at once upon the nervous system which it strikes down, and upon certain organs which it congests and causes the semblance of a phlegmasia in them; we refer to cholera, for example. Here the nervous system is stricken with such impotence at the onset, that the system is powerless to perform any coction, and the organism is about to succeed, oppressed by the morbific cause which overloads it and cannot be eliminated, like a stomach gorged with food, which is incompetent to fulfil any act of digestion. There is then need of the most energetic excitants to restore to the fibre that vitality without which the morbific cause cannot be eliminated.

Asiatic cholera must be placed in the first rank of diseases in which the excitants may be useful, as pneumonia and acute articular rheumatism must be placed in the last; but there are intermediate affections which, as they lie nearer to one end or the other of the scale, demand or repel the use of excitants.

The longer a disease takes to pass through its phases, the more the system needs strength to perform these incessant successive coctions, which are required by the long-continued absorption of new morbid products; thus in typhoid fever, confluent small-pox, the use of excitants is often indicated, independently of the septic nature of the cause, by the sole fact of the slowness of the morbid revolutions, while in pneumonia, measles, discrete small-pox, the temperants are almost always exclusively indicated.

The long duration of a disease is an element indicating the excitants;

but this element is much less important than that which is drawn from the septic nature of the morbid cause. Plague and typhus furnish striking examples.

It follows that the indication for excitants is determined less by the local symptoms than by the general state. When a vascular fever is energetic, the pulse full, and the secretions regular, we shall never think of using excitants, even if we find no important local lesion ; and, on the contrary, we should never hesitate to give energetic excitants if, while auscultation demonstrates a very extensive pneumonia, we found the pulse small and weak, respiration slow, the skin cold, and the muscular force depressed. And if it were necessary to increase the fluxion to the chest, we should still use excitants, for it is very rare for death to occur by the lungs, but much more commonly by the general stupefaction which strikes all the organic elements and extinguishes the functional aptitudes of the elementary molecules, as it does those of the tissues and the apparatus.

The last proposition may seem a little paradoxical to the partisans of the new medical ideas, accustomed to measure graphically the gravity of a disease by the extent of local lesion; and we will linger upon it a little.

In pneumonia, the extent of the affection is admittedly of importance ; but this variable extent is, very certainly, not the principal element. We see people die with one lobe hepatized ; we see others survive inflammatory fluxions which invade an entire lung. Against the opinion of those who regard the local state as the exclusive point of origin for general troubles, we observe that these general troubles are in some of intense severity, in others very slight, a difference which is not explainable by the simple fact of pulmonary lesion.

If, then, the general, or sympathetic, or symptomatic troubles (whichever we prefer to call them) constitute the real danger, and if the patient is to die of these troubles, even if the respiration is slightly affected, is it not evident that a treatment which puts a stop to these troubles ought to be used at all cost, even if it aggravates the local condition (which is not threatening), since the functions of the organ are not decidedly disturbed ? But if the signs we have mentioned above indicate excitants in pneumonia, we shall not hesitate to administer these heroic remedies, even if we should for a moment increase the pulmonary phlegmasia.

We ought not to say, as the anatomical school often says, that debilitant treatment is suited to pneumonia, excitant treatment to typhoid fever ; but only that the excitant or debilitant treatment is opportune in a given state of the system connected with pneumonia or typhoid fever.

We cannot say absolutely that excitants are indicated in old age, and contraindicated in childhood and adult life. The reaction is, of course, *cæteris paribus*, much more energetic in youth than in old age ; but the nature of a disease may by exception place the system of an adolescent in the condition habitual to old age, and in some circumstances the old man may preserve sufficient juvenility to react like an adult. The physi-

cian should hold himself duly warned, and should follow, not the age and the local signs, but the febrile state.

He should also pay great attention to the habitual excitations of the patient. For if in the state of health the person reacts but slightly to the most energetic causes, the morbid excitants which in disease take their place will be as powerless to produce fever as alcohol previously was. This is the case with drunkards. In them, the febrile excitation caused by an erysipelas, a phlegmon, an anthrax, sometimes even by rheumatic fever or pneumonia, is so weak, that it is inadequate to the digestion of the morbid products, and the excitants become necessary, even such as the system is accustomed to; the alcoholic excitation and that due to disease should be united and act in concert. But if the morbific cause has a septic character in these persons, the excitants require to be by so much more powerful, as the system has been long accustomed to the impression of stimulants.

These various states of the system in which we have found indications for excitants should be ranked under the common title of *asthenia* (Brown), or *adynamia* (Pinel). It remains to speak of *ataxia*, in which the excitants are equally indicated.

In our view, ataxia is characterized, not, as has been said, and is so erroneously repeated in our time, by convulsions, contractions, delirium, etc., but by the symptoms which we have named as characteristic of malignity, on which we have insisted so much when treating of musk; we refer our readers to them, contenting ourselves with adding that the excitants are always more or less indicated in this complication of acute diseases.

The choice of excitants is of some importance; and yet it is hard to lay down rules which do not vary under the influence of a thousand unexpected circumstances.

The simple, general excitants, as heat, alcohols, ammonia, wines, fermented drinks, gaseous waters, are more especially indicated in this state of general debility, characterized by a uniform enfeeblement of the whole system; the antispasmodic excitants, such as the ethers, the labiatæ, the aromatic umbelliferæ, should be preferred when the symptoms of prostration are accompanied by ataxic symptoms and that oddness, that want of harmony, which characterize the nervous or spasmodic state complicating acute affections.

There are two ways of conceiving of the action of special excitants. They either provoke a general excitation with a special crisis, or they exercise an immediate elective action upon some organic apparatus; in the former case we may consider the medicinal agent as a morbific element which, after stimulating all the organs with which it comes in contact, has a more especial elective affinity with one or another emunctory. Thus the variolous poison may be considered, in the pathological order, as a special excitant of the skin, though it causes general fever and therefore multiple excitation. In the therapeutic order we will compare the

sudorifics with such morbid agents as the variolous, morbillous, and scarlatinous poisons. Certain sudorifics have at the same time this general and special action; of these are the purest excitants: caloric, ammonia, and alcoholic drinks. Other sudorifics seem not to have a general action, whether this action is unappreciated, or remains without effect; at first they increase the activity of the secretory functions of the skin. These are the remedies which we have described more particularly under the head of "Sudorifics properly so called."

The indication for the latter would seem to exist when there is acute fever, and the emunctories remain closed to the elimination of morbid products. If transpiration were aroused, the system would be correspondingly soothed, but experience shows that these excitants, like diuretics and emmenagogues, then become true general excitants, and that they almost always lose in this case the special qualities which distinguish them when the system is in equilibrium and free from fever. The sudorifics are chiefly indicated in constitutional chronic diseases. Small-pox, rheumatism, atonic gout, scrofula, mercurial cachexia, the purulent diathesis, demand the use of these remedies. By favoring the tendency to the skin, the sudorifics present at every moment the blood and its contained morbid products to the greatest emunctory in the economy, and a little of the morbid cause is eliminated every day and every instant.

As these remedies purify only slowly and in detail, they ought (especially in chronic diseases where the cause is so inherent and so easily regenerated) to act a long time in the same direction. In constitutional syphilis, rheumatism, etc., the sudorifics are sometimes kept up for three, six, ten months, and sometimes longer, being occasionally interrupted and resumed.

The sudorifics which act as general excitants—caloric, ammonia, the alcoholics—cannot, like those we have just spoken of, be so long continued as to destroy a fixed morbid cause; as soon as they act solely through the production of an intermediate fever, it is plain that they exercise upon the economy an influence analogous to that which causes an attack of ephemeral fever, and this influence can only be hurtful; but when the morbid principle is in its nature vague and fixed in the system by slight roots, the excitant sudorifics are indicated. Thus in constitutional syphilis, in chronic rheumatism, atonic gout, the former are applicable; the others in fibrous rheumatism, non-febrile gout, as is proved by the utility of vapor-baths in the last two diseases.

We dare not affirm that the non-excitant sudorifics act only by their sudorific power; we think they probably possess special neutralizing virtues, by which they modify the morbid agent. Doubtless it cannot be directly proved; but does it not seem probable, when we see these remedies sometimes acting (though slowly), when the crisis by sweating does not occur?

All that we have said of the sudorifics applies to the diuretics and emmenagogues. Almost all the excitants increase the sweat, urine, and

menstrual flow; but there are more special agents, as the sudorifics, diuretics, and emmenagogues of which we spoke above.

During the fever, when the nervous functions are employed in the performance of new functions, it is impossible to direct their action to one or another apparatus; thus the emmenagogues, for example, ought not to be used until the febrile orgasm is entirely past.

The greater part of the diuretics are at the same time topical irritants, and as such they often inflame the digestive mucous membrane. Therefore, they cannot be given in this way when there are signs of gastro-intestinal phlegmasia, and when there are reasons for supposing the exacerbation of this phlegmasia. Besides, as soon as the diuretics purge they cease to be absorbed, and provoke only supersecretion of the mucous membrane of the digestive tube. When the intestine is healthy and not irritable, they should be given so as not to produce abundant evacuations of the bowels; when the stomach and intestines are affected, another way is still open, namely the skin. We often obtain very free discharge of urine by covering the belly with fomentations of a mixture of tincture of squill and digitalis, or decoctions of these plants.

The mode of action of diuretics in chronic disease is entirely analogous to that of the sudorifics; but it is more energetic, more rapid, and need not be sustained so long. It is even desirable not to sustain it so long, for it might not be without irritation to the kidney, and the digestive mucous membrane.

The emmenagogues are much less special than the sudorifics and diuretics, and this is intelligible if we compare the nature of the excretory organs. The skin always transpires, the kidneys always secrete urine, from the beginning of extra-uterine life to the end of existence; these organs then have a functional aptitude which requires but the slightest occasion to be aroused; but it is otherwise in menstruation; the woman menstruates only about one-third of her life, during which brief period the secretion of blood occurs only fifty or sixty days in a year. Menstruation is, therefore, a transitory, intermittent, accidental function; so many conditions derange it, that the therapeutist who tries to increase or regulate it has great difficulties to meet. That a remedy be truly emmenagogue, general conditions of health are required, upon which it is important to insist.

The menstrual function is not so essential to the constitution of the adult woman that she ought to exercise it in all cases. It is easily disturbed when the general harmony is deeply impaired. As long as these general troubles exist, we vainly try to recall the menses with drugs; the first condition of all is to re-establish equilibrium, and then the special excitant of the uterus becomes an important weight in the scale. The uterine functions are slow to be re-established, not only when there is fever, and distant organs are affected with an antagonistic phlegmasia, but also when, as in chlorosis, the blood is in such a state as not to be fit to produce upon the womb and the other organs the stimulus necessary to

the accomplishment of their functions. And if in this singular malady we see the constant functions, as calorification, innervation, diuresis, diaphoresis, so oddly and obstinately perverted, how will it be with an accidental function like menstruation?

When fever or an antagonistic phlegmasia opposes the menstrual flow, the treatment must be directed to the relief of the fever or phlegmasia; when the cause is plethora, the flow is facilitated by diminishing the mass of the blood or attenuating its plasticity; when the derangement is due to chlorosis, the preparations of iron which restore the blood must be used.

The remedies for the fever, phlegmasia, chlorosis, though so opposed, will be, not emmenagogues, but agents of normal reconstitution, and therefore agents which place the system in such conditions that the womb will efficiently feel the impression of special excitants.

We will now develop further certain of the principal points of excitant treatment.

Observation shows that, in order that a disease should terminate naturally and happily, the system ought to display a certain degree of energy; above which, the morbid symptoms are too intense, below it, too slow—excessive in one case, insufficient in the other, but destructive in both.

In the former, the patient is led to death by a sort of indirect exhaustion of vital resistance, or by the rapid disorganization of the tissue of some leading organ, or by the alteration and superanimalization of the humors, especially the blood.

In the latter, the same result takes place, but in another way. The languor of the vital movements leaves the person under the influence of a morbid cause, or of a diathesis which progressively consumes the vital resistance and directly exhausts it, attacks and destroys silently the texture of some important viscus, and at last vitiates and impoverishes the blood by gradually withdrawing the plastic and vivifying elements.

In the one case, the organ is in danger of death by excess; in the other by default.

In the latter, the disease extenuates the system, vitiates it, makes it unserviceable; in the former, the system uses itself up by excess of reaction, and succumbs.

In the latter, we must moderate the reaction or despoil the organization; in the former, it is indicated to excite reaction and restore the system. Why should one of these methods exclude the other?

Neither Brown and Broussais, nor their blind partisans, will ever understand one another until, before rushing upon the sick man with their debilitants or excitants, they choose to see that there is something besides dynamism to be stimulated or moderated—an *impetum faciens* to be precipated or retarded, etc.

Such has been precisely their error; and if the animal were only a mechanism, of invariable internal composition, not organized, and experien-

cing no modification in its inner substance; if, in a word, it consisted only of levers, recipients, tubes, wine-presses, pulleys, cords, pumps, springs, valves, and liquids which vary only in density and temperature, color and quantity, all moved mutually by a subtile and impetuous agent, it should suffice (supposing the mechanism inalterable and fixed) to relax or retain, by suitable means, this motor fluid, to restrain or urge it, to produce calm or tempest in this mechanical system.

In this hypothesis, materia medica would be confined to two agents: heat and cold; for all the excitants and sedatives, other than these two types of the excitant and sedative, invariably possess some specific properties more or less marked, which in some way complicated the excitant and sedative properties, in virtue of which these medical substances are substitutes for heat and cold.

This specificity of action comes from their nature, that is, from their specific internal composition, which is not exactly identical in any one.

In the animal organism, also, independently of the more and the less, of strength and weakness, cold and heat, there are many functions; infinite specificities. These special properties are related to the end of each organic movement, and not to the movement itself, which, considered physically and independently of the function or the end it serves and is identified with, has nothing special.

The stumbling-block of the solidists or dichotomists, ancient and modern, has always been specificity. The word irritated Broussais; Brown could not bear it. We can understand this; it is easy to excite an organism. But that is not the question.

There are very few diseases, if any, which consist solely of a frank, simple asthenia, which is the sole indication to fulfil. Such states are rather consequences of disease than diseases properly so-called.

If we except syncope, which is no disease, but an accident or symptom, the class of *debilities* is limited to convalescences, the effects of excessive discharges, of violent fatigues, of prolonged deprivation of several of the things called non-natural; and these states, reduced to themselves, whether local or general, limited to an organ or an apparatus, or extended to the whole system, have no specific quality. There lies the triumph of excitant treatment.

Look at a syncope; the nervous system only has failed. There is no diathesis to attend to, no vice of organization; nothing specific; and any agent which can primarily and rapidly produce an *impression* on the nervous system will restore its action, and the syncope will cease.

Remark that this result may be obtained by the aid of any agent, provided its influence is primary, prompt, and penetrating, a circumstance which at once removes the idea of specificity. Thus a moral impression will have the same power as a piquant aroma, a diffusible cordial, a pain, a physical commotion, the throwing of a few drops of water into the face, a burn, etc.; and the proof that these different methods are only as blows of a whip to the nervous system is, that a still more certain means of re-

storing innervation consists in horizontal decubitus, which assists the arterial circulation from the heart to the brain, etc.

Such is the type of the effects proper to excitant treatment; it is what was once called "recomforting the animal spirits." Ask no more from the excitants, unless they have, by their chemical or internal nature, some special property, useful in one or another case of special debility.

Take for an example a less simple asthenic state, and we shall at once see that if excitation is still indicated, it is not sufficient by itself, and pays no other part than that of a stimulus charged with the fulfilment of one of the indications and favoring the action of another property, curative and entirely distinct from the former.

The excitants are properly given in the above forms of debility, consecutive to acute diseases, loss of blood, deprivation of *ingesta* or hygienic *circumfusa*, etc.

But who would limit himself, as in syncope, to the prescribing of these therapeutic agents? If the physician should not add analeptic tonics, either alimentary or ferruginous, etc., do we not see that the stimulants would only exhaust the neurosity or the acting forces (which is the same thing), and that it is necessary to combine reparation of the organization, or restoration of the radical forces—which is again the same thing?

How fulfil the second indication? By special agents, that is, assimilable matter fit to maintain and exercise the weakened functions. Stimulants are added, because the nervous system, deeply enfeebled, would sometimes be unable to react upon these special materials.

Thus these analeptic tonics, containing a certain amount of heat, carry with them the general stimulant caloric which addresses the general incitability, and the special substance, aliment, which addresses the special function of digestion. The one is, so to speak, only the condiment and the passport of the other.

In this combination of general stimulant and special tonic there is all that is needed for acting upon the two conditions of every organic function in a being possessed of a nervous system; the one places the nervous system on a level with the wants of the function, the other furnishes the special object of the function.

We now understand the mass of dangerous errors and gross miscalculations which the dichotomists incur. They have paid attention, in the system, solely to the property of being excited and of moving; and, in the modifiers of the system, to the agents of stimulation.

"The life of the animal is kept up solely by external stimuli" (Brown).

"And all that increases the vital phenomena is stimulant" (Broussais).

Thus for these two celebrated rivals specificity is only a word, finality is only a creature of reason; it would shock them if anything could take place in the system without them.

Specificity is not our affair; it is the affair of Nature or of that *internal providence* (what inconsistency in Broussais and his system!) which

we may aid or destroy, but for which we never can substitute ourselves, because man is not permitted to act, except upon the conditions of existence which he is master of, not on the law of their relations, which he cannot change, as he did not establish it.

He modifies these relations indirectly, that is, by acting on the conditions of their manifestation, but not directly. He removes, brings together, increases or lessens the determining causes, he weakens or increases the energy of the excitant causes ; but the efficient cause is beyond his reach. It is his part to study it, to recognize it, to imitate it, if we may so speak, placing it in the conditions which observation shows to be the most favorable for the exercise of the normal function. "I dressed his wound; God cured him."

But in therapeutics, what difficulties ! In order to modify, we must know these conditions of the existence of a disease; and after we know them, the materia medica must furnish specific modifiers. How small is their number !

So, when the indication for stimulation occurs in a disease, we stimulate; but we certainly often stimulate in the dark. If nature turns our stimulating to profit, all the better; but if she employs it contrary to our intentions ?—There lies the difficulty and danger.

While we are dealing only with those simple conditions mentioned in the preceding pages, everything goes of itself, and the instincts of the patient are positive. They may be entrusted with the care of the treatment.

But in these cases, let us remember, there is no morbid cause, or it has ceased to exist, and consequently there is no obstacle to the return of strength.

If, on the contrary, there exists a diathesis or a nervous state precursory of a grave diathetic or organic disease, a spontaneous affection or mixture of the two conditions, and if at the same time the weakness of the nervous system, the debility of some apparatus or the whole system, present a side to the indication for excitant treatment, what are we to do ?

All these cases are of the class of chronic diseases.

What we should do is, to distrust the excitants without repulsing them. We should defer to the indications for their use, with sobriety, keeping our eye on the patient's tongue, our finger on his pulse, our attention upon his nights and his sleep. It is necessary, especially, to substitute the analeptic tonics for the excitants, or to combine them with the latter. If the digestive apparatus repulses the former, we should rarely use the excitants alone, for then we know not what we are doing.

The materia medica possesses for such cases, if not specific agents, at least modifiers which add to the excitant power some special property which fits one or another diathesis or condition. Thus, the waters of Vichy are exciting, but they are something more. They seem to contain principles favorable to digestion. This is but one example. When we

have to modify one secretion or another, we also find excitants, but they not only excite the gland, but also the function and product of the gland.

With alcoholic drinks or strong infusions of labiate plants or exotic stimulants, you will excite, even irritate the action of these glands, and this is all. You will have irritated these glands, often sufficiently to suspend their action in some degree—we mean, to diminish the quantity of their products. Wine does this constantly to the salivary glands, and cantharides to the kidneys, etc.

But iodine and mercury are also excitants. They stimulate the action of the glands, but they add to the stimulant power (which they share with the above remedies) a property which modifies the gland, changes and fluidifies its products, impresses other qualities upon them, and each in its own way—iodine differently from mercury, mercury differently from gold, gold differently from potassium, baryta, etc.

We continually find ourselves face to face with our two conditions, in regard to the drug and to the system.

The spirit of excitant treatment must be sought only in this simple and natural consideration. There is nothing systematic in it.

Chamomile is more suited to a given dyspepsia than wine, mustard, etc. Here we return to what we said above touching the existence of a special action independent of excitation; and that brings us back again to the fact that the asthenic malady is not only asthenic, but, in addition, presents indications which excitant treatment by itself does not fulfil.

The maladies which are connected with the lymphatic constitution might furnish very useful examples.

These maladies certainly possess an element of debility. But it is impossible to see debility alone in them.

Yet this indication deserves our attention, but without forgetting the vice of organization, to the nature of which the element of asthenia is subordinate.

The use of the hot remedies alone, the violent, incendiary, and bare action of these remedies, only irritates such organizations. It kindles in them a fever, more consumptive than critical, especially when (as is too common) they are nervous and irritable subjects, and at the same time frail and soft. Then, while stimulating simply, you are only fortifying the diathesis, by allowing it to have its own way. In this person the temperament and the constitution are not in harmony, as in the person who is at once scrofulous and apathetic, that is, whose nervous system is soft and indolent like his tissues, cold like his blood.

In this case, in fact, while stimulating the nervous system you check the progress of the diathesis. In the other, you exaggerate the undesirable disharmony between the temperament and the constitution, between the nervous system and the vegetative functions.

We do not possess a specific stimulant for this shocking disease, nor

remedies which modify equally well both conditions of the affection; for we must remember that an excitant of the nervous system is much more easily found than a plastic modifier.

Nevertheless, some substances approach this effect more or less nearly. The excitant bitters are such. Combine a residence in a dry and hot climate with a reparative diet and the bitters in question, second these remedies by the influence of gymnastics, and you will obtain, as far as possible, the simultaneous action which we are seeking.

Add to these remedies those taken from the antiscorbutic plants of the family of the cruciferæ.

We cannot too highly recommend the use of wine and of syrup composed of the root, etc., of these vegetables. They furnish a happy combination of the two modifiers which we desire. There is a moderate stimulation, and there are principles very appropriate to the diathetic peculiarity of scrofulas. The preparations of walnut are also, in these cases, of a special value, of which we are happy to speak in high terms.

For children, who are specially liable to this disease, the antiscorbutic syrup is a precious preparation. The chronic phlegmasias which pass incessantly from this to the acute state, and back again, to the eyes, ears, chest, skin, bones, etc., almost all, in children, arise from the scrofulous vice. These children, "full of humors," find in the antiscorbutics a sort of panacea for all their ills.

These morbid states, which we do not always sufficiently connect with the scrofulas, because the latter do not always appear with their classic signs—these states, if they leave the child, do so only to seize upon the adolescent in other forms: to affect the adult, under names and aspects which put the practitioner to rout, and when he is an old man, they afflict him with incurable or mortal affections, the nature and origin of which remain unknown.

Build up the child, then, while his material is passing through the facile changes of his rapid evolution, which form a better ground to work upon than is the case later.

Why have the antiscorbutics grown out of date in such cases? They have one chief quality; they are *simples*. The discoveries of modern chemistry have substituted for them the antiscrofulous excitants drawn from the mineral kingdom.

The metals, chemically introduced into the blood, ought to be the *ultima ratio* of medical therapeutics, as, when applied physically to the body they are the *ultima ratio* of surgery. For purging and vomiting they are very well; but when they ought to remain, no longer acting so solely upon the nervous system, which repulses them as enemies and strangers, but modifying the system, we must always look twice, for they dissolve and alter the living matter (says Sydenham) much more than they revolt the "vital spirits."

The vegetable is assimilable; the mineral is not.

We therefore prefer the antiscorbutics and the bitter and aromatic

vegetables to iodine, barium, and their preparations in the treatment of scrofulous maladies. It should not be inferred that we reject the latter. It is right to use all that can be useful and abuse nothing.

Finally, let us remember that if all the antiscrofulous remedies are excitants, all excitants are not antiscrofulous.

There is an indication for exciting the urine; but the disease does not consist wholly in scantiness of urine and a serous effusion which we wish absorbed. This insufficiency of urine, this effusion, have their causes, which sometimes oppose the provocation of diuresis. It also often happens that, when diuresis is produced, the therapeutic result is not attained.

All does not lie in excitation, but in the mode of exciting, and in the result, which does not depend on the excitation, but the excitation much rather upon it.

That which we should seek, therefore, are special excitants.

If we find none, we must remember that in exciting we touch but one of the conditions of success of the curative method; and then we ought to attempt to reach the other condition by the therapeutic or hygienic modifiers, which are directed by the nature of the disease.

We will say in regard to diaphoresis the same that we have said for the digestion, the secretions, and diuresis.

To obtain by active sudorifics a useless diaphoresis is to do harm. The indication for exciting the functions of the skin must first be well judged, and the administration of the sudorific perfectly opportune.

In acute and in chronic diseases we direct to the skin. In the former a peremptory crisis is sought. A suppressed function is simply re-established, and this return of the skin to its functions, or their enormous evacuation, produce a discharge at once revulsive and derivative. The reaction of the nervous system relaxes; its stiffness and resistance give way; the heat of the blood is tempered, and the chance of irritations and phlegmasiæ is thus lessened in two very efficient ways, which may act together.

We then use slightly stimulant drinks, the effect of which is increased by making them warm.

In chronic diseases, other sorts of sudorifics are used. They have bitter, acrid, special, and alterant properties. They act more by their qualities than by their temperature. Such are sulphur, antimony, guaiac, sarsaparilla, squills, the sudorific woods, etc.

So always; on the part of the disease, an indication for exciting, but a much stronger indication for a special agent. To act only upon the organic reaction is to satisfy only the least important and the easiest of the indications. All, or almost all, consists in acting upon the proximate cause of the disease or on the diathesis, and we know from the above general principles, that stimulants do not respond to this need.

Do the mercurials act as excitants in constitutional syphilis?—for they are excitants. If they were nothing more, they would not be specifics.

So if the venereal disease, which enfeebles, were nothing but asthenia, it would not be a specific disease. It attacks the organism, and enfeebles by altering it, while its effects upon the nervous system are only indirect. If this hypothesis could account for this specificity, we might be content to act upon it alone. When mercury has this effect, it is rather a misfortune than a benefit. It is better for the mercurial influence to pass silently, in the inner depths of the alterant action of the plastic force upon which the morbid agent chiefly acts.

What of the emmenagogue excitants? Does not what we have said of the other stimulants of special functions apply still more exactly, if possible, to these? Count the emmenagogues; they are innumerable, and new ones are daily discovered.

Here is an amenorrhœa. What is simpler? Emmenagogues are in abundance. You have rue, savin, iodine, ergot of rye, for obstinate cases, and imperious indications; mugwort, saffron, castoreum, acetate of ammonia, carbonic acid gas, for the small cases, etc. Do not trust them. Nothing is harder than to provoke the suppressed menses.

A great many morbid states hold the function in check, and simulate (so to speak) the part of pregnancy. How often a careless physician stumbles against such a contraindication!

One of two things happens: either the emmenagogue succeeds, or the morbid obstacle resists its action. Suppose the emmenagogue carries the day; it has forced the contraindication. Do you think your conquest legitimate? No. You have produced a uterine hæmorrhage, but you have not re-established the menses ("regulated").

Does this word say nothing to you? No other word could replace it in our eyes. There is something very specific in the function. Is it merely a metrorrhagia, an accidental hyperæmia, such as nosebleed?

It does not follow that there are no emmenagogues, and that we ought never to seek to re-establish directly the arrested flow.

A woman in good health and habitually regular suffers a suppression. Her menses were flowing at their proper time, when a moral emotion, a sudden chill, a fall, etc., stopped them short.

If the physician is called at once, he may immediately give an emmenagogue, together with some slight antispasmodics, acting favorably upon the moral feeling of the patient when the suppression is due to fright, vexation, etc., and re-establishing the vital expansion in the skin if there has been a sudden chill. In this case an emmenagogue may restore the menstrual flow. But if it fails to act at once, we may try again, at the next period, to bring on the uterine flux by all prudent methods.

Between the suppressed flow and the indication for re-establishing it, there is no other more primary indication. We have only to arouse the play of a function, only one of whose conditions is hindered, and this is the least important condition, being only an adjuvant. It is therefore the easiest to re-establish. The other belongs to the nature and to circum-

stances which we do not know sufficiently in order to produce and second them.

What fragility in this function! It is not absolutely and immediately necessary to the individual life of woman, who lives without it, but does not live specifically, that is, for her special function, and becomes a "*declassed*" and abnormal being if amenorrhœa is natural to her; or else does not live truly, or lives only to suffer, in case the imperfection is accidental, as in relapsing chlorotic amenorrhœa.

We take this example as the type of the cases in which the action of the emmenagogues is not illusory and their use is well indicated. Several other circumstances enter into this species of amenorrhœa, and we can apply to them what has been said.

But when amenorrhœa is, as we said, spontaneous, and only marks some morbid derangement, we come back to cases in which we must repeat what we formerly said of the relations between pregnancy and menstruation.

There are certain amenorrhœas which might be called essential or primary. They are not symptomatic of a morbid state, nor of any other external accident. These cases are rare, and may require the use of emmenagogues.

The frequent use of these remedies is a sign of empiricism. A great practitioner rarely uses them. The iron preparations are more than emmenagogues, and we ought not to compare them with those which we described among our excitant remedies. They are chiefly applicable to the amenorrhœas which we have named idiopathic or essential.

Iron acts on the two conditions of menstruation, the blood and the nervous system; the most efficient part of their action is the fact that they affect the blood before the nervous system. They go to the end before modifying the means, and modify the latter by the former. All is then co-ordinate, and the function is truly co-ordinated, especially if nature continues the work of art, after commencing it.

The emmenagogue stimulants, on the contrary, may cause fluxion of the womb; but they either cause hæmorrhages which are not the menses, or, if they restore the function legitimately, it is because the diathesis of the function (so to speak) pre-existed, and was only awaiting an auxiliary stimulus.

This (to return to general excitant treatment) is what very often happens when this treatment is used in asthenic diseases governed by some special morbid state.

An indication for stimulation presents itself, without evident contra-indications. The physician gives excitant treatment, and the weakness disappears, the special morbid state improves. Here, again, nature was well-disposed; the diathesis was exhausted; the nervous system had nothing behind it to prevent its harmonizing with the organization, drawing from it energy of action, and thus giving to this organism all the vital resistance of which it is susceptible.

We ought to say that such success is rare in chronic disease. It is to this class of acute disease that those resurrections belong which are due to excitant treatment.

In several parts of this treatise, where we have developed the saying of Hippocrates, "Febris spasmos solvit," we have spoken at large of these laws and this general fact, and need not here return to them.

We refer to the chapters on General Tonic Treatment, Analeptic Tonic Treatment, and especially Neurosthenic Tonic Treatment, for much that we need not repeat in this place.

CHAPTER XIII.

SEDATIVES AND CONTROSTIMULANTS.

Digitalis.

It is very curious that the two diseases, in the treatment of which digitalis has an unquestionable value, are very often united. In fact, when organic affections of the heart have reached a certain degree of development, and have caused a distinct obstacle to the venous circulation, various effusions, partly cellular, then visceral, almost invariably complicate the primary disease. Then digitalis fulfils at once the two capital indications for which it is exclusively suited, as we may say.

Nevertheless, digitalis is most of service in the palliative treatment of organic diseases of the circulatory centre, when cellular infiltration and serous engorgement does not exist. We have seen digitalis, wisely graduated at this period, so improve the patient that he thought his inexorable disease forever conjured, and we should have thought the same had it not been for the persistence of physical signs, so complete was the disappearance of the physiological or rational signs. But, in a few months, fresh palpitations, a more intense dyspnœa, renewed the patient's alarm. A few doses of digitalis again quieted the symptoms, until at last this virtue was exhausted, and retained only the feeble and inconstant privilege of bringing some imperfect relief to the orthopneic anguish of the unhappy victim of aneurism.

It is fortunate when the action of digitalis merely becomes exhausted, and we are not forced to suspend it on account of the intolerance, the irritation, the heats, the pyroses, which this powder sometimes causes at once, and at other times after an interval; which makes it important never to abuse tolerance, and to suspend the remedy from time to time. It is easier to prevent this trouble than to stop it after it commences; we are often unable to overcome it, and the least doses reproduce a half-quenched irritation, especially as many aneurismal patients are gouty, and have a very intractable stomach.

There is an important distinction to be made between organic affections of the heart, in regard to the indications for digitalis. It is indicated whenever (for whatever cause) there is hypertrophy with or without dilatation of the cavities of the heart and the ventricular contractions are energetic, etc.; but in that which Corvisart called passive aneurism, as distinct from the preceding, which he called active, when the cavities of

the heart are not only dilated but also thinned and flaccid, and when, almost from the outset, the infiltrations are considerable, and also the coldness of the extremities, asphyxia, lividity, etc., digitalis, by checking the movements of the heart, increases the pathological state; and this is why we said above that its use was chiefly indicated in the commencement of hypertrophies. It is true that the symptoms assigned to passive aneurism are by no means accurate, and very often coexist with considerable hypertrophy. Digitalis has then an incontestably good effect. It regulates and tones the heart to the great surprise of the physician, who supposes that he ought not to give it on account of cardiac asthenia and the scorbutic state of the system.

It is a very noteworthy fact, which has not been sufficiently remarked that the sedative action of digitalis is less certain and less marked in purely nervous palpitations than in those dependent on an organic lesion of the heart. In the latter cases the palpitations are not due primarily to a nervous superexcitation of the heart, but to an organic state, and thus the sedative drug modifies, without difficulty, the activity manifested by an organism, the sedation of which is opposed by nothing, so long as circulation is still possible; while in the former case, the nervous system is primarily overexcited, and is only calmed by reaching the causes of its excitement and erethism. An organic disease of the heart, pure and simple, due, for example, to contraction of one of the orifices, etc., is not a true disease; and if this assertion is surprising, we would ask if the slow and progressive asphyxia of a man whose neck is surrounded by a cord which is drawn a very little tighter each day so as to kill him in one or two years is a malady. The unhappy sufferers from these purely organic affections of the heart die without disease, full of life and health. The diagnosis of this sort of cases presents neither difficulty nor merit; for there are no therapeutical indications to find, only a fact which the newest pupil can discover after a week's practice, and knows as much as the discoverer. This, however, is true only of the mechanical obstacle to central circulation; and the organic affections of the heart are almost always something more than that. If there were only the physical obstacle, these diseases would not be grave; but they are almost always caused by a localized morbid affection, a degeneration of the muscular tissue, a special phlegmasia, etc., which is, much more than the physical obstacle, the cause of all organic and functional disorders.

Professor Bouillaud has very long considered digitalis as the cinchona of the heart. This way of regarding it has received a new support from the most recent studies. Like Ferrand, we have inferred from the sphygmographic examination of the pulse that in cases of asystolia digitalis increases the vascular tension. Murray (*Med. Times*, March 18, 1865) is of the same opinion, and adds that the action is more marked in proportion as the tonicity of the heart is enfeebled; he regards it as dangerous in hypertrophy of the heart, and does not recommend it in aortic insufficiency except when accompanied by dropsy. Gull is of the same opin-

ion (*Schmidt's Journal*, 1866). Rigal, on the contrary, considering the disturbances of heart disease as chiefly produced by changes in the small vessels, and not admitting that digitalis acts on these, seems to allow but little value to the remedy ("De l'affaiblissement du cœur et des vaisseaux dans les maladies cardiaques," Thèse, 1865).

Phlegmasiæ.—The use of digitalis in phlegmasiæ dates from the beginning of the century. Rasori proved their controstimulant action, in his military and civil clinics at Milan, with such success that he placed it nearly in the same rank as bleeding. He was soon imitated by Tommasini at Parma, Borda at Pavia, Fanzago at Padua, and afterward in England by Maclean, Currie, Canning, etc. He at first used it chiefly in pneumonia, but other physicians gave it in other phlegmasias; Cusanis in acute articular rheumatism, Reil, Jos. Franck, and Haase in fevers, etc. (Giacomini: Ed. of the "Encyclopédie," p. 171, 1839).

The method of the controstimulists having found little favor in France, except in regard to the antimonials, digitalis fell into disuse, until taken up lately by the Germans. Traube, repeating the thermometric observation of De Haën, recognized that the most constant sign of fever was elevation of temperature; that in certain diseases the series of thermometric observations so accurately represents the intensity of the fever, and, consequently, that of the disease, that the thermometric tracing gives a curve which is the faithful image of the varying severity of the disease at the different periods of its evolution.

He next inferred that remedies which lower the temperature would equally lessen the disease; and he thus came to resume the practice of the Italians.

Traube was followed by Wunderlich, of Leipzig, Ferber, of Hamburg, Thomas, and in France, by Hirtz, and one of his pupils, Dr. Coblentz. As the researches of these observers are in general known in France only through the labors of Hirtz and Oulmont, it will not be useless to give here a summary of the German studies. Traube remarked that, twenty-four to thirty-six hours after the administration of digitalis, the pulse began to fall, and that the temperature diminishes subsequently at the end of thirty-six to sixty hours. This lowering is marked by the fact that the temperature in the afternoon does not reach the point marked in the exacerbation of the day before, or is even absolutely lowered. Thomas even says that in typhoid fever the temperature falls to the normal point; Wunderlich also says he has observed it. This fall of temperature is generally maintained during the whole period of the administration of digitalis, and persists even after it has been suspended (Wunderlich, Thomas, Ferber). But the authors do not agree upon the interpretation of this lowering of temperature. Traube, having found that the pulse first falls, thinks that the fall of temperature is only a consequence; Wunderlich thinks the contrary, believing that he has observed that the temperature is the first to fall, and he consequently gives the inverse explanation.

Traube has been followed by the larger number of partisans, including

Kulp, Hirtz, and Coblentz. The results of Wunderlich have been much criticised, even in Germany, and this rapid fall has been considered as an exception. It has finally been decided that these experiments should be repeated at the Leipzig Hospital.

In France, this treatment of phlegmasiæ has been repeated by Duclos (of Tours) in pneumonia, by Gallard (*Bull. de thérap.*, 1866), and by Oulmont, in acute articular rheumatism.

Typhoid fever.—Wunderlich, and after him a pupil at Strasburg, named Ladevère, have prescribed digitalis in typhoid fever. Wunderlich finds that the infusion of digitalis is easily absorbed by the digestive tube; it retards the pulse and lowers the temperature. The amount required to obtain this result is less than in phlegmasias. Take 1½ to 3 grammes (gr. 22—30) of the powder in infusion, divided among from three to five days, suffices; but this amount needs to be increased, if it is given irregularly or late. The influence is felt by the temperature more than by the pulse. There is at first a more marked diminution lasting several days (primary effect); then a rapid and considerable lowering (secondary effect); then a slight elevation sometimes occurs, of little duration and soon followed by recovery. Twenty-four hours after the cessation of the remedy, its action is still felt, but it is exhausted after this time.

This indication has not equalled in practice its theoretical promises, and one of Wunderlich's pupils, Hankel, is forced to admit that if digitalis lowers the patient's temperature and arterial tension, it seems on the whole to prolong the disease. The other French works of Hirtz, Coblentz, Violland, etc., do not show a real action upon the evolution of the disease, and digitalis will always remain in this case much inferior to cold water, as ordered by Currie.

Metrorrhagia.—Digitalis may also be useful in active hæmorrhages, as hæmoptysis, and especially metrorrhagia.

Dickinson, in England, has made interesting experiments upon digitalis, considered as a means of exciting the muscular contractions of the uterine walls. The author has been led to suppose that this remedy has the power of exciting the womb, by the effects observed in cases of menorrhagia and accouchement. He gives digitalis, in the enormous quantity of 15 or 20 grammes (ʒ iv.—v.) in twenty-four hours, in infusion, and in the very great majority of cases of menorrhagia treated exclusively by this remedy the result has been a prompt cessation of the bleeding. In several cases, each dose of digitalis was followed by uterine pains resembling those of labor, by expulsion of a clot, and the temporary cessation of the flow of blood, the intervals after each dose being greater. He further cites a case in which the delivery was terminated by the use of digitalis, and several cases in which labor-pains were re-excited and greatly quickened by the same treatment. According to this, digitalis should have an action quite analogous to that of ergot of rye. The author says that he has not found in these cases any distinct effect upon the contractions of the heart and the pulse.

We have repeated these experiments upon women at the Hôtel-Dieu, and must state that in a certain number of cases digitalis in infusion in the dose of 1 or 2 grammes in fractional doses has rapidly put an end to metrorrhagia which had lasted for weeks. We had previously taken the precaution to let the patients have several days' rest after entering the hospital. We might quote other physicians, including our friend Lasègue, who have also obtained favorable results from this treatment. Contrary to Dickinson's assertion, we observed in one patient, in whom the metrorrhagia had lasted a month, that digitalis had a most marked effect on the circulation, and that the pulse fell from 68 to 48. We have often since then repeated these trials, and are convinced that digitalis is one of the best uterine hæmostatics. We have had especial reason to congratulate ourselves on the treatment of the menorrhagias which are so common at the menopause, and in those which are symptomatic of fibrous bodies or uterine myoma. We have also found advantage in hæmoptyses accompanied by a pronounced hæmorrhagic molimen; but we must add that it seems to us neither prudent nor necessary to push the doses as far as the English do.

Incontinence of urine—Spermatorrhœa.—Digitalis has lately been extended to the treatment of these affections. Should the good effects (which have repeatedly been proved in both diseases) be referred to a direct sedative action upon the bladder and seminal vesicles, or are they due to a special exciting action, analogous to that which it seems to exercise upon the womb? This is a question which we cannot resolve at present.

Gout.—It is not rare to find patients who, after attacks of gout which have been imprudently treated by Lartigue's pills, Boubé's syrup, or Vichy water too long continued, or drastic purges, fall into a deplorable cachexy, accompanied by habitual oppression, infiltration of the lower extremities, obscuration of sight, etc. This grave condition, usually irremediable, may be usefully treated by infusion of digitalis, raised by degrees to the amount which causes slight vertigo, and continued some months, while at the same time the patient takes every three or six days 8 grammes (ʒ ii.) of good calisaya bark in infusion of coffee.

Dropsy.—Dr. Bayle, who, in the third volume of his "Bibliothèque thérapeutique," has collected in a precious article all the ancient and modern essays on digitalis, has reached the following conclusions by the comparison and analysis of these facts.

The remedy is in general suitable for cases of simple dropsy, not complicated with disease of the heart, accompanied by general weakness, and soft pulse in persons with a pale complexion and a cold skin, which retains the impression of the finger.

Robust persons of florid complexion, firm flesh, warm skin, with abdomen tense, hard, and circumscribed, rarely experience the good effects of digitalis.

These are absolutely the same as Murray's conclusions. There is only

one objection, namely, that these indications and contraindications are scarcely ever encountered in patients.

All the writers who have praised it, in the treatment of dropsy, from Withering and Darwin, have excepted encysted dropsy. "Nec in una leviori specie hydropis fert opem digitalis; sed in plerisque, iisque difficilioribus; ascite, hydrothorace; excepto unice hydrope saccato" (Murray).

From all the cases compared in Bayle's work it follows that wherever digitalis has succeeded in the treatment of anasarca and dropsy, it has increased the secretion of urine.

We will make but one remark upon this point, namely, that the most diuretic preparation of digitalis is the maceration, which contains little or no digitalin. We are accustomed to have a maceration prepared with 30 centigrammes (gr. 4½) of the powder, which soaks for twenty-four hours in a quart of distilled water. This preparation, when well borne by the stomach, brings on in three or four days an abundant diuresis, which sometimes rises to 8 or 10 quarts a day, if the dropsy is considerable. Unfortunately, if the dropsy returns soon after it is cured, the maceration will have much less effect, and at last will not act; it is the same when there is interstitial nephritis.

Delirium tremens.—The use of digitalis in delirium tremens dates from 1860, and is due to Dr. Jones, of Jersey, who stumbled upon it in practice. He set to work, and in sixty-seven cases he lost but one, using large doses of digitalis. The treatment was followed by Peacock, and John Watt Reid, who cured all their cases. In France, Bauchet, Velpeau, Nonat, Launay, of Havre, and ourselves have used the same treatment with success for ten years; and we have lost but one case, probably because we did not increase the dose boldly. Jones began with 15 grammes of the English tincture (℥ ss.). If this is not enough, a second is given in four hours, and it is only exceptionally that a third, of half the amount, is required on the next day.

Velpeau gave the following:

℞. Mucilaginous julep.....	125	grammes	(℥ iv.).
Tincture of digitalis*.....	15	"	(℥ ss.).
Extract. thebaic.....	0·05	"	(gr. ¾).

M.

This draught was taken in five doses during the day; if the delirium was not calmed, a second was given through the night. Punch was added.

We begin with a draught of 5 grammes (teaspoonful), which we renew once, twice, or, if needed, three times more, during the twenty-four hours.

The patient shows an astonishing tolerance for digitalis in this state

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* Of half the English strength.

of delirium tremens. The drug is feared, because the action of digitalis is so slow that we have to give a new dose before we know the effect of the first one. But, to reassure our confrères, we must say that it is astonishing how little effect there is upon the pulse. These details are found in the thesis of Dr. Bindé (Paris, 1866).

In the moderate dose of 2—4 grammes (3 ss.—i.) the tincture has been used by Dr. Williams to calm the agitation of mania (*Bull. de thér.*, 1866, t. II., p. 43); by Robertson to quiet the excitement of general paralytics (*Bull. de thér.*, 1863, t. I., p. 424), and by Bigot to calm the agitation of epileptics (*Annales médico-psychologiques*, 1874, p. 179).

Antimony.

Acute pneumonia.—Rasori, without fully explaining what he means by *stimulus* and *controstimulus*, thinks that in the treatment of pneumonias it is necessary, in order to conquer the disease quickly, to carry to the digestive organs all the controstimulant action they can receive, and to subtract from the vascular system a portion of the stimulant material with which it is filled. He satisfies the first indication by tartar emetic, and the second by bleeding; bleeding and the drug, according to him, act in exactly the same way.

If we measure controstimulation by the effects of the controstimulants, we cannot admit Rasori's opinion; for experience shows that in certain epidemics of pneumonia, tartar-emetic or other antimonials, used to the exclusion of all other remedies, produce cessation of the febrile phenomena sooner than when the patient is bled before or simultaneously. This fact alone allows us to infer that antimony does not act like bleeding.

According to Rasori, tartar-emetic in a large dose is only borne in certain states of the system, that is, when the disease is sthenic, or, to use his own expression, when there exists a diathesis of stimulus. While admitting that the antimonials in general are never so well borne in pneumonia as when the sthenic symptoms are most strongly dominant, we will nevertheless affirm that the tolerance is wonderfully established in profoundly debilitated persons, who certainly need no antimony to take strength from them. On the other hand, we see the most healthy persons, with the exception of a tremor of the knee, for example, which causes no reaction, bearing the antimonials with the same ease as those affected with pneumonia. Rasori has professed, and others after him have ascribed to him a grave error, namely, that it was necessary to be sick, and sick in a certain way, in order to bear large doses of antimonials. We may say, on the contrary, that except in gastro-intestinal inflammation, almost all men bear considerable doses of antimony. Rasori and his supporters have not seen that if well persons do not bear antimonials, it is because well persons do not submit themselves to diet, which is one of the chief conditions of tolerance.

Rasori blames, with a sort of disdain, those who cling to the local symptoms of disease, and who do not seem to take account of the stimulant or controstimulant diathesis. To be consistent, he must admit that few diseases are associated with symptoms announcing the highest degrees of the stimulus diathesis, more frequently than articular rheumatism and pleurisy; but the antimonials almost always fail in these two diseases, and with the more certainty in proportion as the inflammatory symptoms are violent; and, on the other hand, in latent pneumonia, antimony succeeds almost as well as in the fluxion of the chest which is accompanied by the most evident signs of the diathesis of stimulus.

Dance and Chomel do not explain the mode of action of antimony as Rasori does. According to them, this agent has no special property; when it purges and vomits it acts like other purges and pukes; it has no local action when it is perfectly borne.

The opinion of Broussais is quite like that of the latter; this illustrious pathologist regards the antimonials as more potent revulsives than blisters or sinapisms applied to the skin, as they act on a larger surface, and often provoke an abundant secretion from the gastro-intestinal surface.

The explanation of Dance and Chomel is based on special facts; they saw, and our own observations are fully in accord with theirs, that in articular rheumatism (for example) improvement did not usually occur except when the antimonials caused vomiting and diarrhœa, and that the same results were obtained by ipecac and drastic purgatives. They thence infer that it should be the same in pneumonia—evidently false logic, for here they have no facts to support their opinion. If in rheumatism the improvement of the symptoms is the most usual consequence of the emeto-cathartic action of the drug, in pneumonia (on the contrary) the improvement becomes evident, both when antimony is well borne and when vomiting or diarrhœa supervenes or persists. The error of these two physicians, then, arises from applying to one disease that which was only true for the other.

Dance, in a remarkable work, in which he subjects to a severe and conscientious criticism all the works that have been published on the action of tartar-emetic in pneumonia, reaches this conclusion, that if this agent has done no harm, at least its utility cannot be made evident by the facts which he analyzes, and that, in these circumstances, concurrent bleeding had probably favorably affected some pneumonias which were treated by tartar-emetic.

It seems to us that the opinion of Broussais in relation to the mode of action of antimony, especially in pneumonia, cannot bear discussion, and that it is completely overturned by the argument which we just now set forth, namely, that in pneumonia the inflammatory symptoms are as surely and speedily removed when the antimonials cause no trouble with the gastric viscera as when they produce violent vomiting.

Yet we cannot deny that the famous method of Rivière in the treatment of pneumonia lends a great support to the opinions which we have

just attacked. In pneumonia, Rivière gave emetic doses of the drug daily, and sometimes twice a day, until the febrile symptoms were calmed, and his facts need not be doubted.

In truth, it is probable that Rivière had been led on to praise this method exclusively by the successes he had obtained in a period of years when the "medical constitution" required it. Desiring to form our own opinion, we have treated many patients in pneumonia since 1838 by Rivière's method, also bleeding them once or twice; they took, morning and evening, for the first two days of their stay in the hospital, and on following days only in the morning, 1 decigramme of tartar-emetic (gr. 1½), and 1 gramme of powdered ipecac (gr. 15). This emetic was given in two doses, with a quarter of an hour's interval between. The vomiting was more or less copious, and some felt a sense of weakness which approached syncope. While in this strange condition the pulse was weak and the skin lost something of its febrile heat.

The method has actually been of use to us, and it still renders us important service daily.

But it does not follow, from the success of Rivière's emetic method, that the antimonials act as emetics. We admit that the emetics are good; we also admit that the antimonials, when they cause vomiting, are also good, and we even admit that they have an analogous action to that of the antimonials, which are tolerated; but it still remains true that the antimonials, given in controstimulant doses, have their summum of therapeutic activity when they are best tolerated.

In general we attach very little importance to the explanations which may be given of the mode of action of these remedies. We see in therapeutics only two things; the remedy applied to the organism, and the remote result of this application. As to the intermediate phenomena, they escape us, and probably always will. If, then, we may venture an explanation in our turn, we declare in advance that we will gladly sacrifice it to any other which seems to us more conformed to the observation of facts; this explanation, which we have long given in our lectures, and in the hospitals where the experiments have been made, differ very little from that which Téallier has published in a work on tartar-emetic.

Many medicinal substances have a special action on certain apparatus. Belladonna and stramonium calm the movements of respiration, and all practitioners know the marvellous results which may be obtained by smoking the leaves of these plants by patients suffering from certain affections of the respiratory organs. Digitalis retards the movements of circulation—opium accelerates them. Most toxic vegetable substances have a special action, so much so, that it is easy to recognize, by the symptoms, the poison which has been applied to the living organism; it is the same with the animal and mineral poisons. Between the poison of the bee and that of the scorpion, between the toxic action of arsenic and that of mercury, there is an immense interval. Why not admit that antimony acts as a toxic, and that its influence is felt especially by the heart and

the respiratory organs, whether this action be exercised directly or by the medium of the nervous system? In what respect, we ask, is this explanation—agreeable to clinical results as it is—in discord with the considerations which we have named in respect to the influence of the different poisons? If, then, our experience proves that antimony, independently of all local action, produces retarded and enfeebled pulse and respiration, how easily can we see that it cures pneumonia. Let us suppose a patient in this disease, with a pulse of 120 per minute, with a force which we will represent by ten, and a respiration of forty, with efforts which we will represent by four; suppose now that by the use of antimonials the pulse is reduced to sixty, and its force to one-half; the result will be, on the one hand, that the right ventricle and the bronchial arteries empty themselves into the lung only one-half as frequently, and on the other hand, the impulse of the heart being weaker, the mass of blood sent thither is correspondingly lessened. The inflamed lung then receives, first, much less blood by the bronchial arteries, as a parenchymatous organ, and as an organ of hæmatosis it has much less blood to elaborate.

If we now suppose that the patient breathes no more than twenty-five times a minute, and does it without effort, it is easy to see that the therapeutist, in giving antimony, has placed the lung in exactly the condition in which the surgeon places a fractured limb; that is, after having modified the inflammation by appropriate treatment, he keeps the limb at rest.

It is evident how the acute diseases of the pulmonary parenchyma and those of the vessels are so happily treated by antimonials, and how the parenchymatous phlegmasiæ in general yield more easily to this remedy than those of the serous or synovial membranes. We also see why antimony checks febrile heat, which is almost always in proportion to the force and frequency of the pulse.

Since the publication of our papers on the therapeutic action of antimonials, in 1832, a very active controversy on this subject has arisen. Attacked with a violence often unjust, boasted by others with passionate exaggeration, antimony has still remained in the realm of therapeutics, and now that the personal questions have been forgotten a little, it is easier to judge of this grave and important question. The emetic has at last convinced the most incredulous; and since Louis, that grave and truthful observer, has emphatically stated the evident efficacy of tartar-emetic in acute pneumonia, no one has doubted; the case is settled. It is otherwise with the other antimonials. Kermes has not established its citizenship, certainly not because of a less efficiency, but because we were almost the only ones who pursued its use in Paris, and the new hospital where we tried it was not at the centre of the capital, like the Hôtel-Dieu, and no crowds of students witnessed, as formerly, the numerous successful trials. It is quite evident, that kermes, in the treatment of pneumonia, yields in nothing to tartar-emetic; it even has the advantage of being much less irritant, and much less frequently causing those phlegmasiæ of the mouth and throat and those gastro-intestinal inflammations

which sometimes oblige us to stop the tartar-emetic before it has accomplished its work, and especially the work of preventing relapses. Metallic antimony, unwashed diaphoretic antimony, in a word, the most irritant preparations, do not really differ from the emetic except in dose ; as to their general effects, they are still the same. The insoluble preparations, such as washed diaphoretic antimony and the different oxides of antimony, were praised by us in 1832 and 1833, at a time when they produced diarrhœa and vomiting as easily as kermes produces it to-day. Then (and the fact is very important) kermes and metallic antimony often irritated to such a degree that we could not use them ; the insoluble preparations, on the contrary, possessing much less irritant properties, found an easy and happy application. To-day (1851) we exclude from the treatment of acute pneumonia of adults the insoluble antimonials, excepting kermes and regulus, because they no longer render us the same service as formerly. In a few years it will probably be necessary to return to them, as soon as the "medical constitution" has changed, and the system no longer tolerates in safety the action of tartar-emetic, kermes, and regulus.

Still, we have very lately proved in our hospital the happy effect of white oxide of antimony in children's pneumonia ; and numerous facts, published under our auspices in the periodicals, leave no doubt of that fact ; but we have to use quite large doses of the white oxide, and kermes is certainly able to produce the same result in smaller doses.

Let us return to the analysis of the effects of antimonials in pneumonia.

We are at once arrested by a flagrant impossibility. The statements of different authors, doubtless true, are so contradictory that the mind remains in suspense and one is forced back on one's self, to ask of one's own experience. This mode of judgment is certainly not free from reproach, but in truth, as long as the authors who give us statistics pay no attention to medical constitutions and to those external influences to which the old physicians rightly attached immense importance, it will remain quite impossible to use these statistics.

Most of the antagonists are agreed upon one fact, namely, that antimony renders great services in extreme cases. This admission would seem to justify the inference, that the drug may be of still greater use in cases of less extremity, when the powers of the system retain the ability to second its effects.

Almost all authors, even those who have praised antimony with most vivacity, are to-day of the opinion that at the origin of pneumonia (during the first four or five days), bloodletting ought to be used, except in some very rare [atmospheric states ?] "medical constitutions," and in certain patients whose individual constitutions do not really permit bloodletting.

It does not follow that antimony ought to be given only on the fourth or fifth day of pneumonia, and after the blood system has been evacuated;

it should be given concurrently with bleeding and digitalis; and in this way alone can it, by its antiphlogistic properties, so modify the general state that new bloodletting is superfluous.

In some epidemics (one of which we have observed) the antimonials have an astonishing influence; but, when we have found these prodigious results, we are again surprised to find that the same agents have subsequently only a secondary action.

In the epidemic which we observed in Paris during 1831 and at the beginning of 1832, the most intense pneumonias, in the most youthful and vigorous, recovered in a few days without letting of blood; and we even remarked that those who had been bled before entering the hospital were sick much longer than those who had not been bled. The febrile symptoms, the rusty sputa, yielded in the space of forty-eight or seventy-two hours; while since 1834, and even to-day (1851), the antimonials, whose value is still incontestable, are unable, unaided, to lead adults to recovery, at least, in these pneumonias which we observed in our hospital and our private practice, and bloodletting is evidently needful, except for children.

It is important to have a means of estimating accurately the epidemic forms, the general constitutions which more particularly call for the antimonials, but we admit that after prolonged and most scrupulous examination of the general and local morbid phenomena, it has been entirely impossible for us to reach this general notion. It is sad to say it, but it is true: the result of treatment shows the nature of diseases, "naturam morborum curationes ostendunt." When we compare the epidemic of 1831 and 1832 with that of 1837 and 1838, it has seemed to us that the leading point was the fact of a great tendency to gastric trouble in 1831 and 1832. The majority had had vomiting and diarrhœa at home, and were so susceptible in the bowels that the slightest doses of antimony, even of the insoluble preparations, caused, on the first day, a revolt of the stomach and intestines, which it was not easy to quiet with opium, while in 1837 we gave from the first day, without the addition of opium, an enormous dose of kermes (say 4 grammes— 3 i.), which scarcely moved the stomach; and the gastric symptoms felt previous to entering the hospital were less violent and frequent.

It does not follow that the antimonials are useful in proportion as they are badly tolerated, or as they cause vomiting and purging; we shall see what this idea comes to; we only affirm that if it is right to judge by two very different epidemic forms, antimony was more useful in that in which the stomach and intestines were the more irritable.

Without lingering over these different forms of pneumonia, let us rapidly indicate the way to give antimonials in the fluxion of the chest as it is most commonly observed.

As soon as the pneumonia is diagnosticated and bleeding has been performed, an antimonial draught is prescribed, proportioned to the age of the patient, to the antimonial compound, and the medical constitution.

The tartar-emetic is given in sweetened distilled water, 2 decigrammes to 1 gramme (gr. 3—15) for the first day; metallic antimony, 5 decigrammes to 2 grammes (gr. 7½—30); kermes, 1—3 grammes (gr. 15—45); oxide of antimony, 1—10 grammes (gr. 15— ʒ iiss.). All the insoluble preparations should be given in a white looch, or a sufficiently diluted and sweetened mucilage of tragacanth. To children they may be given in powder, mixed with sugar or honey, and placed on the tongue.

At first a tablespoonful is given, or much less if to a child. When the vomiting is not too violent and the colic not too acute, these doses are repeated every hour. In case the gastric symptoms are too severe, the doses are lessened until tolerance is established, and then they are increased in proportion to the intensity of the fever and the general symptoms.

When the fever is quieted, it is proper to lessen the dose, and gradually reduce it in proportion to the progress in convalescence.

The cessation of the fever, and even the greater part of the local symptoms, ought not to be for the physician a motive for renouncing antimonials immediately and all at once. It is necessary to keep on, but to reduce the dose gradually; this is the way to keep the phlegmasia in check, and prevent relapses; for this is the principal point in which the treatment by antimonials alone, or by antimonials united to bleeding and digitalis, is superior to the method of exclusive bloodletting. Bleeding has its limits. If they do not jugulate the disease, to use the consecrated expression, the physician who has only this resource remains powerless; while the antimonials and digitalis, which can be continued, even during convalescence, leave the patient constantly under the influence of the remedy which has arrested the course of the disease.

Antiphlogistic action of antimony in other diseases.—It is said that the effects are equally good in articular rheumatism, phlebitis, suffocative catarrh, etc. We have made many experiments, and will give our results.

Parenchymatous hœmorrhage of the lung is the disease which yields to antimony most readily, next to pneumonia. A young woman of thirty had had for ten months a pulmonary hæmorrhage (parenchymatous hæmoptysis), for which she had been bled twenty-nine times. Divers plans of treatment were tried in vain. Récamier prescribed washed diaphoretic antimony in large doses, and the cure was rapid and permanent.

A man of forty years was brought to the Hôtel-Dieu, in the seventh day of an extremely grave hæmoptysis which had increased after two bleedings and one application of leeches; seven hours after the administration of antimony, the spitting of blood had disappeared. We have had similar success with a woman of sixty-five, who often suffered from grave pulmonary apoplexy symptomatic of organic lesion of the heart. But we have recently failed completely in the treatment of a young man affected with a very grave parenchymatous hæmorrhage of the lung.

In bronchial hæmorrhage we have not succeeded with antimony.

Suffocative catarrh.—The antimonials have aided us in the treatment

of the suffocative catarrh of old men and the profound pulmonary catarrh of adults and children. This disease, infinitely worse than pneumonia, requires to be attacked by much larger doses.

In simple acute catarrh, where tartar-emetic in emetic doses has so incontestable efficacy, we have generally obtained nothing with this remedy in controstimulant doses. But it is otherwise if the same catarrh assumes a very marked degree of acuteness, if it is accompanied by an intense febrile movement, and especially if by its rapid extension to the capillary extremities of the bronchi, the catarrhal affection threatens to end in pneumonia. In this case antimony in large doses will be indicated, and often, by its use, we shall succeed in putting an end to all these febrile symptoms and checking the threatening progress of the catarrhal affection. It will, in particular, be justifiable to use this powerful treatment when the patient's lungs are suspected, where we must at all cost arrest the development of inflammatory symptoms which may give a fatal impulse to accidental products which had previously been latent.

Pulmonary phthisis.—The same treatment may be of some use in developed consumption. We here recall that an author in repute at the beginning of this century, Lanthois, highly praised tartar-emetic, and that by its means he said that he had checked a great number of cases of this disease. Bricheteau tried to restore the treatment to honor, and said he had had very good results. We can add that there is a certain number of good practitioners to-day who quite often use the controstimulant dose in well-marked cases of pulmonary phthisis, and do not hesitate to present this remedy as truly powerful in checking the inflammatory action around tubercles which tends to soften them, or to combat those pneumonias of variable extent which form so frequent and fearful a complication of pulmonary tuberculization.

Professor Fonssagrives prescribes tartar-emetic in an aromatic or stimulating draught at the beginning of the febrile period of phthisis, in the dose of 2 or 3 decigrammes per diem for two or three months.

We have elsewhere spoken (Pidoux: "Études générales et pratiques sur la phthisie") of the occasional ability of phthisical patients to bear this treatment for some months, and that to make a general rule of it, in supposing that the inflammation and tuberculous fever can be checked without limit, is a great mistake. Either the tolerance is not established, and patients who are already asking for rest are fatigued, or tolerance is established, which is equivalent to no action at all.

The case is quite otherwise with small doses. We often give to phthisical patients a centigramme of tartar-emetic (gr. $\frac{1}{7}$) per diem, and when this is well borne the fever diminishes, the appetite increases, and the strength and flesh return.

Pleurisy.—We have given the preparations of antimony in a considerable number of acute pleurisies, and have never quieted the inflammatory orgasm, as Laennec professed to do.

Diseases of the heart.—We have seen patients with organic heart dis-

ease, in whom the pulse was lowered and the dyspnœa quieted by large doses of tartar-emetic, kermes, and white oxide of antimony; but in a short time, when tolerance ceased, the symptoms reappeared with as much severity as before. In speaking of pneumonia we said that, under the influence of antimony, the circulation experienced much more marked changes than the respiration; the contrary is the case in diseases of the heart.

Phlebitis.—The action of antimony in this disease is scarcely less constant than in pneumonia. In 1831 a young girl was bled to moderate a uterine congestion; in a few days the veins of the arm became inflamed, and leeches and poultices were applied. The next morning the arm was swollen, there were typhoid symptoms, and icteric suffusion of the face. Six grammes of white oxide of antimony were prescribed by Récamier; the next morning the fever had ceased, the arm was supple, the typhoid symptoms were gone, and in forty-eight hours after beginning the treatment convalescence was established. Sanson, Senior, found great value in large doses of tartarized antimony and oxide of antimony in phlebitis following severe surgical operations.

We have twice seen antimonials succeed in puerperal peritonitis.

We think we have aborted a double phlegmon of the tonsils by the same remedy.

Articular rheumatism.—There are few physicians who, having suitably used antimonials in pneumonia, have not recognized their value; but it is otherwise in acute articular rheumatism. Laennec, MM. Vyau-Lagarde, Ribes, Delormeau, and others, regard tartar-emetic in large doses as one of the best means of curing articular rheumatism. Chomel and Dance quote many facts which seem to show that the remedy has in these cases no very incontestable special action, and that the improvement must be ascribed to the emetic and purgative action rather than to its controstimulant properties. We have treated with antimonials more than thirty patients in acute articular rheumatism, and the results have been so varied that we could not possibly state any constant results, as in the case of pneumonia. The success was rapid in four cases; the half experienced decided relief, and complete cure in less than twenty days, while in the other half there was no improvement at all. In three cases the symptoms became considerably worse. In rheumatic patients we did not observe the retardation of the circulation and respiration of which we have spoken; the febrile heat diminished only in proportion to the disappearance of local symptoms, and we have even seen a violent fever persist several times, although all the joints seemed free from inflammation and nothing could lead to the belief that any internal organ (except the heart) was inflamed. The disappearance of the rheumatism was never so rapid as when antimony produced vomiting, and especially superpurgation; a tolerance of a fortnight brought no other change than that which might reasonably be ascribed to the lapse of time. We have repeatedly seen the disease horribly obstinate during the entire time of tolerance, and yielding almost

completely in twenty-four hours after the remedy began to cause trouble with the gastric viscera. Tartar-emetic in enema, or croton-oil, or any energetic purgative, generally produces as good effects as large doses of antimonials.

If, by any treatment, by the application of salts of morphia to the denuded skin, bleeding, drastic purgatives, emeto-cathartics, we had moderated the rheumatism and dissipated the violent fever which almost always accompanies it, we should then derive advantage from the long-continued use of moderate doses of white oxide of antimony or kermes. This would prevent relapses, which are so frequent in all other forms of treatment.

It follows that the mode of action of antimonials in articular rheumatism is quite different from that in pneumonia.

A very grave objection presents itself. If antimony has the influence upon the circulation and respiration which we have ascribed to it, why does it lose this influence in articular rheumatism, pleurisy, etc.? We will reply with another question. If opium puts to sleep, if extract of stramonium quiets pains, why do they not always act thus? It is probably because the nervous modification, in virtue of which the patient is kept awake, and that which excites the painful sensation, are such that the influence of datura and opium is not powerful enough to conquer it. Peyrilhe expressed this fact by an energetic and capital phrase: "If, when we give opium as four, the patient does not sleep, it is because his wakefulness is five."

Let us now apply to antimony that which we have just said, and believe that if the vehement fever of rheumatism is not calmed by antimonials, it is because rheumatism exercises upon the central organ of circulation a sympathetic or direct stimulation of such force that the sedative and antiphlogistic action of antimony cannot overcome it.

Intermittent fever.—The famous bolus of La Charité for quartan fever (bolus ad quartanam) shows clearly the confidence entertained in tartar-emetic. Its composition was as follows:

℞.	Powdered cinchona.....	32 grammes	(℥ i.).
	Carbonate of potassium.....	4 "	(ʒ i.).
	Tartar-emetic.....	80 centigr.	(gr. 12).
	Simple syrup.....	q. s.	

Make sixty boli. Take in the intermission.

In this mixture, the tartar-emetic was decomposed by the tannin and subcarbonate of potassium, and, also, the ounce of cinchona taken between two attacks might well claim the chief part of the honor of the cure.

Nevertheless, in rebellious and atypical fevers, a great disturbance may, in some cases, break the course of the attacks, and tartar-emetic is better suited than any other remedy to produce this perturbation; it acts like a severe indigestion, a great fright, or pain, which have often put an end to a rebellious intermittent. The famous stibio-opiated potion of Dr.

Peysson, so praised in the treatment of obstinate intermittent fevers, has perhaps no use except by the perturbation it causes.

As regards the efficacy of tartar-emetic in grave typhus, we do not think we ought to doubt it; but the authority of Rasori does not seem to us sufficient. Nothing proves that his famous treatment had particularly good results in the petechial fever of Genoa. But we are inclined to think that in certain epidemics of influenza, characterized by the prostration of force and local pulmonary inflammations, tartar-emetic, like most of the other antimonials, may be usefully applied.

The relief which follows an emetic in whooping-cough proves nothing in favor of antimony. The same benefit is obtained by ipecac, so that we must suppose that the effect is derived from the emetic action purely, and not the special action of the antimonial salt.

We have very often seen tartar-emetic prescribed, and have often prescribed it ourselves, in acute inflammation of the mucous membrane of the larynx in children. This inflammation, which simulates the most intense croup, and may sometimes cause it, yields quickly to emetic doses of tartar-emetic and to the use of kermes prolonged for several hours.

Diphtheria and croup.—The emetic dose of antimony has long been given with benefit in diphtheritic angina and true croup. By the convulsive contractions of the expiratory muscles the emetic tends to loosen and detach the false membranes from the pharynx and trachea; and by producing their expulsion it often puts an end to asphyxia which was imminent, and places the child in more favorable circumstances.

The controstimulant dose of tartar-emetic has lately been applied to the treatment of croup, and quite a number of cases quoted by such excellent physicians as Gigon, Valleix, and Bouchut, speak in its favor within certain limits.

Antimony would seem to have here a double mode of action; (1), it is rare that the first doses are not followed by vomiting, when it may be very useful as an emetic; and (2), as a controstimulant, antimony acts on the basis of the disease, that is, it attacks the special diathesis which tends incessantly to reproduce the plastic exudation, and thus to renew the symptoms of suffocation and asphyxia which may for a moment have been driven away. In the case of confirmed croup, it is usual to give a draught containing from 20 to 40 centigrammes of tartar-emetic, which is given by teaspoonfuls from hour to hour. Success seems more likely, as the first doses have an emetic action and provoke the rejection of false membranes.

Nevertheless, we are not so sure as Bouchut seems to be of the complete innocuity of this treatment. There are some young patients whose vital resistance is feeble, or who are debilitated by this essentially asthenic disease, in whom symptoms of prostration occasionally occur, not without danger. Without proscribing this energetic treatment, which, in a given case, may render the highest services, it is our opinion that by reason of

its power it demands great prudence in application, and extreme watchfulness.

Chorea.—There is one application of tartar-emetic in large doses which deserves special mention. Laennec, and after him Breschet, used this method with advantage to combat chorea. But for a long time it had fallen into complete disuse. Gillette, physician at the Children's Hospital, resumed it, and by his modifications and the success which he obtained it may be said that he has established for it one of the chief places, if not the first place, in the treatment of chorea. He uses it as follows:

The treatment is usually composed of a series of partial cures. Each one consists of three days, and is separated from the next by an interval of from three to five days.

The first day, we begin by giving tartar-emetic in the dose of 30 or 40 centigrammes in the twenty-four hours (gr. 4½—6), in nearly the same way as in pneumonia. On the second day from 40 to 60 centigrammes are given (6—9 gr.), and on the third, 75 or 100 (gr. 12—15). This done, we wait from three to five days. If the chorea persists in the same degree, or if the convulsive movements have been only diminished, tartar-emetic is resumed for three days more, beginning with the same dose as in the first period or a somewhat larger one. If after a second pause of four or five days cure is not obtained, or is incomplete, a third series is commenced, with still larger doses. In a few refractory cases a fourth has been required.

Numerous cases have been published by Bonfils, an interne of Gillette, and a certain number of hospital physicians; these cases are not all equally convincing, but seem to us of a nature to commend the treatment. The disease is quite often very considerably improved after the first period; and if the intensity is moderate, it is sometimes at once cured. In the majority of cases it is necessary to make three or four periods in order to obtain complete and final cure. It may be objected that we possess in cold affusions, narcotics, nux vomica, sulphur-baths and gymnastics, etc., a collection of therapeutic means by which chorea is usually conquered; and that nothing compels us to resume a treatment which has once been tried and abandoned, which has something violent and even brutal about it, especially for delicate persons, such as many young girls in chorea are.

We are certainly less inclined than any one to doubt the value of the different remedies which are habitually used for chorea; and we will also agree that the antimonial treatment must frequently encounter practical contraindications and difficulties. But we also know by experience that if chorea generally yields to the ordinary treatment and to the good influences of time, there are certain unfortunate cases in which the convulsive agitation is so severe that all known methods have no effect, and the physician too often sees poor young girls perish miserably before his eyes, with their skin worn through and deeply ulcerated by the incessant rubbings which no restraint can prevent.

Tartar-emetic in large doses presents a new resource, when everything

else fails; and some new cases lead us to hope that, thanks to the energy of this perturbative and sedative remedy, chorea, which has hitherto been incorrigible, may be mastered and broken. Even if the treatment has to be reserved for these exceptional cases, Gillette has rendered a real service to treatment by offering a chance of success where it has been reduced to confess its complete impotence.

The antimonials as external agents are entirely out of use. But tartar-emetic has very important therapeutic uses. It was formerly used frequently to modify sores and cure certain ulcerous affections of the skin by incorporating oxides, the sulphide, the hydro-sulphuret, and even metallic antimony with an ointment. It is a pity that the use of these remedies is to-day exclusively abandoned to farriers, who derive great benefit from it in the diseases of animals.

Bromide of Potassium.

Inflammatory and painful catarrhal diseases.—It first seemed that angina, which is chiefly marked by a painful affection of the throat, and fever, ought, in accordance with the physiological action, to be admirably affected by bromide of potassium. Clinical experience, which is the final judge, has not justified these anticipations, and the drug seems to act much more effectively on spasms produced by irritation of the mucous membranes.

Gubler, who has made many experiments on it, and seems to us to have expressed its action perfectly in these cases, points out its special utility in painful dysphagia, attacks of spasmodic cough, and phthisical angina (*Bull. de thérap.*, t. LXVII., pp. 5 and 49).

It was hoped that the vomiting of phthisis might be arrested by bromide of potassium. Woillez, in particular, had announced that a pencil of charpie dipped in a solution composed of one-third of pure bromide of potassium and two-thirds of water, and passed rapidly into the pharynx before breakfast and supper, put a stop to these vomitings (*Bull. de thérap.*, 1873, II., 395). Unfortunately, experience has shown that this remedy, which sometimes succeeds, is too often faithless.

Whooping-cough.—Harley and Gibb praised this medicine at the first in whooping-cough; they gave it in the dose of 0·15—5 to 50 (gr. 2—80) (*Dublin Med. Press*, January 30, 1862).

Gubler found the same very useful in a case of whooping-cough, and Dr. Antonin of Beaufort, who thus treated twenty children, declares that in five days the characteristic attacks were disappearing and that the cure was generally complete in twelve days. He gave to his little patients from three to eight teaspoonfuls of the following potion:

℞. Bromide of potassium..... 0·30 gramme (gr. 4½).
Alcoholic tinct. of aconite..... 0·25 " (gr. 4).
Syrup of tolu..... 20·00 grammes (3 v.).
—(*Bull. de thér.*, 1867, t. I., p. 460.)

We have thoroughly proved the sedative action of bromide of potassium in whooping-cough, and so has Dr. Chatin of Lyons (Armand: Thèse de Paris, 1872, No. 168); but Dr. Antonin of Beaufort went too far in announcing that he cured whooping-cough in twelve days.

Nervosism.—One of the first successes of bromide of potassium was in quieting the spasms and vapors of women, especially those who have reached the period of the menopause (Vigouroux: Académie de Medecine, 1864). From that time the same remedy has been often used to relieve the nervosism of women of all ages, and even of men; and it has been of much use to us in these cases, in spite of the frequently anæmic state of the patients; but its effects were soon exhausted, and it had to be given up and resumed later.

Neuralgias and spasms.—Bromide of potassium has been often prescribed in painful affections. Samuel Percy gave it in zona (*American Med. Times*, August 13, 1864). Vulpian has not found it faithful, nor have we, in zoster, but he has used it to cure superficial neuralgias and migraines (Pottier: Thèse de Paris, 1870). In one case Siredey arrested the fulminating pains of ataxia (*Bull. de thérapeut.*, 1872, II., 180).

Dr. Cordes, of Geneva, points out another property—that of increasing the intervals of menstruation, if too frequent, in chlorosis (*Bull. de thérapeutique*, 1874, I., 382).

It has been similarly praised by Professor Lasègue for nymphomania (*Archives de méd.*, 1865); by Raciborski for vaginism (*Gaz. des hôpitaux*, décembre, 1868); by Thielmann, Pfeifer, and Binet for certain spermatorrhœas of local origin (Zœpfel: Thèse de Paris, 1869); by Puche, Debout, Thielmann, Pfeifer, and Chauvel, as we ourselves give it, for painful erections in blennorrhagia, and especially chordee or phlegmonous blennorrhagia; by Warburton-Begbie for nocturnal incontinence of urine in children (*Practitioner*, February, 1874); by Cusco for the blepharospasm which accompanies certain painful ophthalmias (Zœpfel: Thèse, 1869), and finally by Bucquoy for mercurial tremor.

Gubler cured, with bromide of potassium, a case of œsophagism. Ferrand checked spasm of the rectum in three cases by the local application of a twenty per cent. solution (*Bull. de thérap.*, 1868, t. I., p. 228). Lafont-Gouzzi cured, in the same way, a case of priapism produced by a fissure of the anus, and a case of spermatorrhœa (*Bull. de thérap.*, 1861, t. II., p. 285).

Chorea.—Gubler has tried bromide of potassium twice in chorea. The first case was that of a girl of sixteen, who had been cured formerly by sulphate of strychnia, and had fallen sick again. She was relieved in three days. The second was a woman five months pregnant, who was cured in a week.

Gubler was not subsequently so successful; but this is because there are several species of chorea. Rheumatic chorea has been successfully modified by bromide of potassium; we can quote the cases of Vulpian (Potier's Thèse, 1870), J. Worms (*Bull. de thér.*, 1869, I., 377), and Bucquoy

(Société de Thérapeutique, 1874), while hysterical chorea is not usually cured by this remedy.

Syphilis.—In twelve cases of constitutional syphilis with tertiary or secondary symptoms, bromide of potassium had not the slightest curative influence. The roseolæ, the mucous papules, the swellings of the glands, were in no respect modified. It was the same with those called tertiary. The chief symptoms observed in the patients who were submitted to this treatment consisted of exostoses, nightly osteocopic pains, caries, gummous tumors, and ulcerations of the throat in different degrees. In not one could the least improvement be seen, though the remedy was continued from three weeks to two months.

Since the publication of the theses of Huette and Rames, Dr. Puche has continued his trials, and without better success. Ricord is entirely of the opinion of Puche in this respect.

Chronic engorgement.—If we must refuse to the bromides all influence upon syphilitic symptoms, must we deny that they may be useful in chronic engorgements?

If we had only the results observed in the iodobromuretted springs of Nauheim, Kreuznach, Homburg, Bourbonne, etc., we could never escape from doubt, for the iodine contained in these waters may be considered as playing the chief part. It was then necessary to do for non-syphilitic engorgements that which Puche had done for constitutional syphilis, viz., subject the patients to the exclusive use of bromides; this was first done by Pourché, of Montpellier; and later by Puche. Pourché has cited very interesting cases of cure, and Rames, in his inaugural thesis, has reported facts collected in the service of Puche, from which it follows that ganglionic enlargements of the neck of quite grave character, and chronic inflammations of the epididymis and testicle, yielded to the long-continued use of bromide of potassium.

None can deny the truly marvellous effects (though slow) produced in countries where muriatic salt springs are reinforced by the addition of the mother waters of the springs; these effects far surpass those observed when iodide of potassium is given alone. It is reasonable to think—it is perhaps permitted to affirm—that the bromides play the chief part in this.

If, then, as the experiments of Puche, Huette, and Rames seem to establish, bromide of potassium (and certainly also bromide of sodium) possess anæsthetic properties, should we not assign to these properties a large share in the cure of certain engorgements, and in the improvement of certain otherwise incurable diseases? Perhaps we may thus explain the incontestably good effects of the mother-waters of saline springs, so happily and skilfully given at Nauheim, Kreuznach, Homburg, etc. To be just, we must add that Salius (Jura), and still more Salies (Basses-Pyrénées) have made progress which places them above the most flourishing establishments of Germany.

Insomnia.—Debout, having given bromide of potassium to obtain anæsthesia of the urethra, observed that his patient was at the same time

cured of an insomnia which had lasted a month, and the relief occurred on the first day. Since then he has had repeated occasion to observe the fact. An Englishman named Behrend gave bromide at the suggestion of Brown-Séquard, to three patients affected with insomnia, and was pleased with the effect.

Dr. Bucquoy also found it effectual in the case of delirium tremens (*Bull. de thérap.*, 1866, t. I., p. 371).

We will add to the list a case of somnambulism, dating from ten years back, cured by B. Lévi of Lupari, and another in a little girl aged eight, cured by C. Pelizzo, of Lonigo (*Gaz. méd. veneta*, 1870).

Neuroses—Epilepsy.—Bromide of potassium has given unexpected results, not only in spasms and vapors, but in epilepsy which may be termed "essential."

We borrow from Dr. Legrand du Saulle the following *résumé* of cases treated with this drug, in which the author proves rare clinical sense and perfect competency.

The value of bromide of potassium in epilepsy was first established in England, in 1851. Sir Charles Locock obtained fourteen successes in fifteen cases, Radcliffe and Brown-Séquard imitated their predecessor, and soon after published extremely significant observations. At the Northampton Asylum Dr. Williams subjected thirty-seven epileptics to the bromide treatment, and in thirty the attacks became considerably less frequent. Robert McDonnel next published the very encouraging results of his own practice, and justly observed that physicians were afraid to give bromide of potassium or gave it in much too feeble doses ("Recherches sur le bromure de potassium," Paris, 1850).

In France, in 1864, Blach cured at the Hôpital des Enfants-Malades a boy aged ten years, who had attacks of epilepsy every night (*Dublin Quarterly Jour. of Med. Science*, 1864). The salt was used in the dose of 1, 2, and 3 grammes (15—45). Almost at the same moment, Bazin and Besnier published three cases of cure (*Gaz. des hôpitaux*, 1865). Public opinion then began to move. Bromide of potassium was accepted in current practice, but the experimenters were generally timid, and used inert doses, which prevented success. My witness is M. Peulevé, interne at the Salpêtrière, who reports that his master, Moreau of Tours, treated patients with bromide of potassium for three months, beginning with the dose [daily] of 50 centigrammes and ending with 3 grammes (gr. 8—45) (*Union médicale*, 1865). In spite of his skill, Moreau was forced to fail. In adults he obtained nothing, in so short a time and with such slight doses.

A. Voisin proved this fact in the interesting clinical account which he published in 1866 (*Bulletin général de thérapeutique*), containing the very conclusive observations which he collected at the hospital of Bicêtre and in general practice. This excellent practitioner had the courage to order large doses, from 4 to 12 grammes per day (ʒ i.—iii.). The remedy did not seem to him useful in epilepsy connected with cerebral lesions, either congenital or accidental, while it was very valuable in epilepsy due to

great impressibility, to exaltation of the sensibility, to the "nervous temperament," to acute emotions, to fear, to genital excitation and to hereditary influences. "Of twenty-four patients," says A. Voisin, "who were treated with the bromide of potassium, four ceased to have attacks, six were much improved, ten a little improved, four felt no good effect from the remedy."

What became of the patients after Voisin left the Bicêtre, and how does the remedy succeed at present in his former department? We may learn from J. Fabret, who sends me the following note:

"On the first of April, 1867, I took the care of the third section. At that time at least twenty patients were under treatment by bromide of potassium. Of fifteen epileptics already treated with success by A. Voisin, and who had continued to take the bromide until they left or to the present day (October, 1868), ten experienced so notable a change as to be almost equivalent to a cure in several cases, in which the attacks had become extremely rare. For these fifteen patients the dose was from 7 to 11½ grammes per day (gr. 105—175), but the latter dose was prescribed for only one patient.

This improvement has remained at the same point since April 1, 1867, and existed previously. Among these fifteen, seven are still in the section, and of these, four continue to be very notably improved, while the three others seem to feel no favorable influence from the continued use of the remedy.

At this moment twenty-one epileptics are still under the treatment. Among these are, 1, the seven patients above mentioned, already treated by A. Voisin, including four very considerable improvements and three failures; 2, eight patients who took bromide more than a year, four of whom were very notably improved, and four experienced only a very doubtful influence; 3, six patients who have taken it for too short a time (one or two months) to enable us to notice any effects.

"I have made the following general observations on the use of the bromide: 1. The favorable action does not begin to be felt until the dose [daily] of 4 grammes is reached. 2. The dose has been carried progressively to 11½ grammes (gr. 175), which was the maximum, without causing any trouble. 3. The usual dose at which I stop is from 7 to 9 grammes (gr. 105—135) per day. 4. Favorable results are not usually perceived until the skin shows the eruption of pimples, especially in the forehead and face, and in general the patients who have no eruption on the skin experience no good effect from the action of the bromide. 5. Very few patients complain of the remedy and ask for a suspension, but most say that they are making progressive improvement, and ask to continue the use of the bromide, even when they leave the hospital. 6. I have not seen at the Bicêtre any symptom or trouble which was due to the use of bromide of potassium."

I will now give my own experience. This may be divided into three very distinct stages, of which I will give a complete account.

1. *Period previous to the bromide.*—From 1856 to 1864 I treated in private practice seventeen epileptics. I obtained one cure (in a young man of twenty), by the use of tincture of cantharides, four very appreciable improvements (belladonna, lactate of zinc, valerianate of quinia, etc.), and I had twelve failures.

2. *Fruitless use of the bromide.*—From 1864 to 1867 I treated, in private practice, nine epileptics. By atropine, nitrate of silver, hydrotherapeutics and gardening, I considerably improved three patients and failed in six others. In despair, I then gave the bromide to the latter. I had just read accounts from the special clinic of Brown-Séquard of London, and had been surprised at the favorable results obtained by this eminent practitioner. I began by giving 5 centigrammes a day (gr. $\frac{3}{4}$), in three doses, and after many trials and hesitations I increased it to 1·10 (gr. 17). In these six cases the remedy had no appreciable result.

3. *Success with the bromide* (1867 and 1868).—Collecting, as A. Voisin did, the facts observed at the Bicêtre and those in private practice, I reach a total of forty-one epileptics who were subjected by me to the treatment with the bromide. I begin by striking off one case of saturnine epilepsy and two alcoholized patients, in whom the convulsive symptoms had been distinctly observed and noted. All three were cured ; but did the bromide have a part in the result ? Would they not perhaps have been as readily cured without the drug ? I think they would.

There remain 38. My notes and observations give me the following figures: Cure very probable (no attack for eleven months), 1; very prolonged suspension of all epileptic symptoms (from three to seven months) 5; decided improvement (remissions of twenty-five to seventy-two days), 6; failures, 9—total 21; 17 other patients, including 10 from the Bicêtre and 7 from outside practice, have been treated for a variable period. I reserve for a later period the summary of the clinical documents which concern them, though I can already state that some cases promise well. But I must declare that (at least for my own part) the proportion of success is larger in my private practice than at the Bicêtre, which is very naturally explained by the cerebral complications presented on entrance by the majority of the hospital cases. The intelligence of the patients outside was in all cases sound, and the conditions therefore favorable.

I should place here a fact of practical observation which speaks eloquently in favor of bromide of potassium. With the preparations of belladonna, quinia, digitalis, valerian or zinc, with nitrate of silver, ammoniosulphate of copper or tincture of cantharides, we sometimes obtain the most unexpected remissions, but these improvements not seldom relapse into a worse state. It even seems that the intensity of the relapse is in direct proportion to the duration of the armistice. Owing to a really exceptional property, the bromide of potassium increases the intervals and has no bad effect on the character of the later convulsive symptoms. The coming attack may be expected to be like the past one, or it will be weaker. I here present a rapid summary of a very curious clinical observation

communicated to me by A. Dufour and Baudouin, physicians to the Bureau de bienfaisance of the IXme arrondissement.

Monsieur B., aged thirty-eight, whose mother died of cerebral hæmorrhage, and who has lost ten of eleven brothers and sisters. Of these ten, only one reached the age of seven years, when he fell a victim to convulsions. B. lived in a very marshy locality, and his spleen was much enlarged. Five years ago, after very severe misfortunes and numberless privations, he was taken, for the first time, with a sudden loss of consciousness and epileptic convulsions, after which he remained well for a year. At the end of this time he began to fall every two or three weeks, and next he began to have every time a series of three or four very violent attacks with deep biting of the tongue, foaming at the mouth, trismus, etc. The grinding of the teeth was such that almost all of them were broken. On coming out of the crises he was irritable, quarrelsome, passionate, "and remained almost idiotic for three or four days."

A. Dufour and Baudouin prescribed for him, in 1866, 6 grammes of bromide of potassium daily, and a single attack of epilepsy followed after twenty-nine days of interval. "At this time (October 23, 1868), the last attack but one goes back to February 7, 1863, and the last one to September 16, 1868. The dose of 6 grammes was continued during the first year, and the patient to-day takes only 6 grammes (ʒ iss.) on every third day. The sleep was very agitated, but has become extremely peaceful; the causeless irritability has disappeared, and the physiognomy has resumed an expression "much less brutish and stupid."

If in such a case I dared to give advice, I would say to MM. Dufour and Baudouin, "You have control of the disease; give the bromide, raise the dose to 7, 8, or 9 grammes (gr. 105—135), and it is very probable that your patient will have no more fits for eight or ten months."

In 1866 Martin-Damourette and Pelvet had occasion to treat a young man of twenty-four, who had been epileptic nine years, and had five or six full attacks monthly. They prescribed for him "bromide of potassium in the daily quantity of 2 grammes (ʒ ss.) for the first week until there was an improvement in the attacks or signs of bromic intoxication. Improvement did not begin until at the end of a month (with doses of 8 grammes), and it showed itself directly by the cessation of the full attacks." Martin-Damourette and Pelvet undertook a whole series of experiments, the scientific account of which is extremely curious;* and they have formulated the very clear opinion which follows: "It is because bromide of potassium possesses a double action as a vascular and a nervous hyposthenisant, that it is so remarkably useful in the great congestive neuroses of the nervous centres, such as epilepsy and eclampsia, hysteria and nervosism, etc." Such, according to these distinguished observers, is the curative mechanism of bromide of potassium in epilepsy,"

* "Étude expérimentale sur l'action physiologique du bromure de potassium," Paris, 1867.

and we must say that this view is shared by the very great majority of physicians.

Thomas, of Sedan, communicated on the 5th November, 1867, to the Medical Society of Rheims, twenty-four clinical observations in support of a memoir on the therapeutic action of bromide of potassium in epilepsy. The results obtained by him were as follows: Success, 8; improvement, 8; failure, 8. "Bromide of potassium," he said, "has an incontestable and powerful effect in epilepsy. To obtain it we must raise the dose to 6 grammes at the least." In my opinion Thomas is entirely right. I will only remark that, to all appearance, our honorable confrère has obtained his remarkably successful figures by experimenting only on patients in the city, and not on epileptics in an insane asylum.

I began by stating the important part which the English physicians took in the first stages of this treatment, and in deciding the exact effects of bromide of potassium in epilepsies; and I shall close with a clinical summary from a very distinguished practitioner of Great Britain, Clouston, physician-in-chief to the Asylum of Cumberland and Westmoreland, has just published a paper in which he states very clearly the results of his practice. He collected twenty-nine cases of ancient date; he noted their respective situations, and paid special attention to the number of attacks, the weight and temperature of the body, the physical and mental condition; he then subjected them all to the same treatment, giving progressively increasing doses of bromide, continued the treatment thirty-eight weeks, and took the precaution to note every week upon a special bulletin the morbid peculiarities of each one.

"The total number of attacks among these patients," says Clouston, "fell gradually to the sixth of what it was previously. The attacks by day were reduced approximatively to a twelfth, and those by night to about a third. The reduction in the number of attacks was not uniform in all cases. In one case it increased twenty-four per cent.; in half the cases there was no diminution at all, though the crises were much less severe.

"In a fourth of the cases, the mental state was greatly improved. The irritability of character and the tendency to sudden violence were remarkably diminished in these cases, and nevertheless, I had chosen the most troublesome and excited cases.

"The epileptics who derived the most advantage from bromide of potassium were in very various conditions, as respects cause, age, number and nature of attacks, but in general those who fell most frequently were improved."

We see that Clouston is placed in the least favorable conditions; and yet, thanks to the scrupulous rigor of his mode of observation, and also to his persevering zeal, he has produced sensible and truly enviable effects. What a lesson for those who disbelieve in any possible alleviation of the lot of epileptics!

And now, after the enumeration of all these facts, may we not say that neglect or imperfection in the treatment of epilepsy is worse than a sim-

ple mistake? Dumesnil, chief physician of the asylum of Quatre-Mares, lately informed me of the success which he obtained in his epileptic department by the aid of tincture of digitalis, and was astonished, as I was, to find that our whole category of diseases was placed under the ban of the society, in a sense. This injustice ought to cease, and epilepsy, though often leading to deceitful results, ought no longer to pass for an "opprobrium artis."

The struggle requires long and patient experiments, for brief trials will lead to nothing. But what is one year's treatment, compared with the long series of misfortunes through which the comitial disease leads its victims? We must still make many trials, for, though we should not be easily discouraged, it is a matter of course that persistence in an obstinately sterile treatment is absurd. After the first well-established check received by bromide of potassium, I constantly find myself prescribing valerianate of quinia, neutral sulphate of atropia, lactate of zinc, tincture of cantharides, nitrate of silver, copper filings, globules of chloroform, tincture of digitalis, or hydrotherapeutics. If I fail again, have I not gymnastics, fencing, gardening, joiner's work, life in the open air, dietetic regimen, etc.? Do I not sometimes commence the bromide treatment afresh, taking care to modify the first conditions of experiment, and to have the salt tested by the pharmacist, and to watch its action minutely? One of my five cases of improvement was obtained in this way.

In case of epilepsy, in order to gain a little ground we must try hard. To have obtained nothing is to have never sought. Tenacity is one of the weapons of therapeutics.

Many physicians have already given bromide of potassium for epilepsy, and I hear from them of their failure. Their efforts were necessarily sterile. In fact, according to Bouchardat's indications,* they have prescribed the drug in the dose of 1 or 2 decigrammes (2 or 3 grains) per day! or they have followed Cazenave,† whose dose ranges from 1 decigramme to 1 gramme (gr. 15), or the advice of Bossu,‡ who gives from 5 decigrammes to 2 grammes (gr. ¾—30). If, with the hope of avoiding all mistake, they have consulted the latest and best authorized of all publications,§ they find that Buignnet recommends excessive reserve, and reproduces a formula which gives the patient 17 centigrammes (gr. 2½). These doses are absolutely inert, and no effects are obtained under 4, 5, and 6 grammes. The maximum dose in my opinion is from 8 to 10 grammes, according to cases (3 ii.—3 iiss.) without always reaching this maximum.

I have, for instance, been treating the son of one of my confrères since December 15, 1867; he had then one attack per week, and has had

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* "Nouveau formulaire magistral," 9me éd.

† *Agenda médical* for 1868 (Asselin. éditeur).

‡ "Agenda-formulaire des médecins praticiens."

§ "Nouveau Dictionnaire de médecine et de chirurgie pratiques" (J. B. Baillière, éditeur).

only two for four months past; I have never thought fit to exceed the dose of 7 grammes in his case.

I handle bromide of potassium without any rashness, and I do not raise the doses progressively until I have ascertained the effects already obtained. The system of progressive doses is fully justified. Habit makes everything less effective. But there is a rational limit of saturation which I do not overpass. In exceptional cases, when the organs are growing fatigued, the functions are languishing, and the features changing a little; I do not think it necessary to descend the scale and diminish systematically. I have found it much better to suspend the treatment, to let the patient rest a little while, and then resume. This is a minute point; but I justify the motto of this work, and pay homage to the words of an illustrious master: "The remedy is nothing, the treatment everything; and the mode of administration, especially, has something sacramental." *

In all respects, bromide of potassium is an easy remedy to give. It has no disagreeable taste, and has no such dangerous physiological effects as are generally supposed; and in this point it is better than its reputation. I know that authors have noted frontal headache, snuffles, lachrymation, gastric excitation, loss of strength, confusion of motion, acne, partial abolition of general sensibility, benumbing of the genital sense, indifference, apathy, somnolence, intellectual obtuseness, stupor, very sensible increase of appetite, constipation, and especially emaciation! If all this were true, what must have been the state of the bromide patients at the Bicêtre, those of Fabret and my own, and those also of Clouston! Yet the latter author said that "in general, the weight of the epileptics was greater at the end of thirty-eight weeks of treatment than before commencing."

The cause of the error is certainly this: ioduretted bromide has been used, and symptoms of iodism have occurred. The chief part of the effects I have named are those of iodism.

Acne itself, to which I by no means attach such importance as J. Fabret does in respect to prognosis, is often rather iodic than bromic.

It is true that virility is temporarily chilled by bromide free from iodine; but epileptics are so afflicted, and so ashamed of their state, that they never hesitate to give up the use of the sexual power for a time. Increase of appetite, overactivity of the renal function, diminution of sweating, a slight retardation of the circulation, fetor of the breath, insensibility of the velum palati, the base of the tongue, and the epiglottis, itching of the scalp, and constipation, are in general the only physiological effects produced with 6, 7 or 8 grammes of bromide (ʒ iss.—ii.). I once noted a little bromic intoxication in a patient of thirty-seven years, for whom I had rapidly raised the dose to 9·50 (gr. 140), but otherwise I have never seen the least trouble.

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* "De l'épilepsie": *Gazette des hôpitaux*, 1855.

The purer the bromide is, the less the patients perceive the effects of the treatment, with the exception of the anaphrodisia which supervenes in all cases. The physician should always prescribe it free from the iodide, and should test the remedy he orders. Nothing is easier: the starch-paper shows the presence of iodide of potassium by a blue color. Bichloride of mercury, added to the suspected solution, gives nothing with pure bromine, but forms with iodide of potassium a very handsome red precipitate of biniodide of mercury.

I have never derived good effects from ferruginous bromide of potassium. Should not the association of a calming agent with an excitant result in nullity of action? I have prescribed this preparation for a chlorotic person affected with hystero-epilepsy, for an anæmic epileptic, and for a young choreic patient, but absolutely to no effect. Besides, the ferruginous bromide is at present furnished in the form of pills, each of which contains 15 centigrammes of bromic salt and 5 centigrammes of the iron salt (gr. 2·2 and gr. 0·7), so that, in order to give six grammes of bromide in a day, we must make him take forty pills! If that is possible, how will the system bear two grammes of iron?

As A. Saison *.has remarked, no question in therapeutics is more discussed at present than that of bromide of potassium. I will add that there is no chemical question more pathetic or more worthy of the attention of all. The Imperial Society of Medicine at Lyons seems to share this view, for Teissier, professor of clinical medicine, has quoted in the last session of this learned body, cases of hysteria and epilepsy notably alleviated by bromide of potassium. "I have attended," he says, "a young man of Montbrison, who, for several years past, has had crises of epilepsy twice a month. Since he has had this treatment, he has had only three attacks in five years, and the last dates from nine months back. If the attacks are not completely suppressed, they have at least been considerably retarded."

"I can also give (says the same writer) the case of a young lady from the suburbs of Tarare, who had attacks twice a week. For the year in which she had taken bromide of potassium, she has suffered only once in six weeks. I also recollect two melancholic and neuropathic ladies who have been greatly relieved by the treatment with bromide. I do not fear, then, to state that this treatment can be employed with advantage in nervous pains, locomotor ataxia, and all the diseases of the nervous centres." †

If I had been the only one to obtain success in epilepsy, I should still doubt, and, in the fear of being the dupe of an illusion, I should keep silence. But it is evident that I am not, in this case, the courtier of misfortune. Others have seen, and see daily. I believe in their experience and am confirmed in my own.

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* "Du Bromure de potassium," Paris, 1868.

† *Gazette médicale de Lyon*, 15 novembre, 1868.

From the preceding considerations, I believe I may deduce the following chief propositions:

1. Epilepsy is very often indicated at its outset by insidious diseases (giddiness, vertigo, absences of mind, cramps, spasms, incontinence of urine), the true pathological sense of which is not recognized, and which therefore receive no rational treatment.

2. These initial symptoms are always manifested in the same way They constitute, taken by themselves, the incomplete attack or *petit mal*, and they reproduce in brief the exact image of the commencement of the disease, or *grand mal*.

3. When once the convulsive habit is contracted, the crises return without appreciable cause in virtue of a sort of routine. When the retrocession occurs, the full attacks first disappear, while the incomplete ones are influenced last. Epilepsy thus ends as it began.

4. Not only is idiopathic epilepsy oftener curable than has been supposed, but in many other cases it is possible to obtain very prolonged suspension of all the epileptic symptoms. These remissions are almost equivalent to cures.

5. Of all the remedies praised for epilepsy, the bromide of potassium, free from iodide, is certainly the most efficacious. When it does not considerably lessen the disease, it at least checks the shocks and startings, the nervousness, the irritability, and the impulses. It calms, without even exciting.

6. Bromide of potassium does not begin to produce appreciable effects in adults with less than 4, 5, or 6 grammes (ʒ i.—iss.), and may be increased progressively, according to indications, to 9 or 10 grammes per day (2¼—2½ drachms).

7. The physiological action of the disease never produces any serious effects upon the health. The temporary anaphrodisia alone should be previously stated to the patients.

8. Every physician can obtain success in epilepsy upon the following conditions: Exceptional perseverance; irreproachable purity of the drug; watching the effects once a week; continuance for a year, and during the second year resuming it every three months for thirty consecutive days (*Gaz. des hôpitaux*, 24 et 25 novembre, 1868).

The treatment of epilepsy by bromide of potassium has since become in a sense classic; and there is no physician who has not had success with it.

Puerperal eclampsia.—The good results in the treatment of epilepsy naturally led to the use of the same treatment in puerperal eclampsia. Dr. Shoyer cured an eclamptic primipara by giving her daily 10 grammes of bromide of potassium (ʒ iiss.). Morély, L. Collin, Vidaillet, Raciborski, Bucquoy and ourselves have cured certain cases with the same drug. Cimbert, of Cannes, showed also that a solution of the bromide, given by injection, stopped the obstinate vomiting of pregnancy.

Tetanus.—Trismus in the wounded has been cured, or rather promptly

arrested, by bromide of potassium, as also tetanus when the convulsions were limited and slowly developed (Bachencel, Bruchon, May-Figuera).

Asthma.—Professor Sée, in the article on this subject in the "Dictionnaire encyclopédique," praised bromide of potassium, and has found imitators who have also recommended it (Saison: Thèse de Paris, 18 juillet, 1868).

Intermittent fever.—Vallin does not offer bromide of potassium as an equivalent for sulphate of quinia, for the attacks which resist the bromide often yield to the first dose of the other; but tertian neuralgias which had resisted the sulphate of quinia were promptly stopped by bromide of potassium. In certain cases of intermittent fevers, rebellious to the sulphate of quinia, the bromide has broken up the series of attacks, and stopped the fever for a long time (*Bulletin de thérapeutique*, 1873, II., 433). Barndel has also cured migraines of paludal origin ("Recueil des mémoires de médecine et de chirurgie militaires," 1867).

Organic disease of the heart—Cerebral congestion.—Gubler has found in the bromide which so considerably diminishes the circulatory energy, a very precious remedy for cardiac hypertrophy and cerebral congestion.

Diabetes.—Begbie, of Edinburgh, says that he has improved a number of diabetic patients by bromide of potassium. He quotes among others the case of a man sixty years of age who had used the ordinary treatment without success, and recovered very well in two months of treatment with bromide.

Bromide of Ammonium.

Whooping-cough.—Dr. Harley, thinking that the characteristic accesses of cough are produced by reflex action of the pneumogastrics, since from whatever point the irritation arises it produces a convulsive state of all the parts innervated by these nerves; and, also, remarking that all the attacks are preceded by a tickling of the throat, has proposed to anæsthetize the laryngo-pharyngeal mucous membrane with bromide of ammonium. He gave from 25 to 50 centigrammes (gr. 4—8) to children from eighteen months to three years old, and says that the benefit was substantial.

Dr. Gibb, physician at Westminster Hospital, has likewise treated a certain number of very young children in whooping-cough, giving them 10 to 15 centigrammes three times a day, and professes to have found it useful. He also reports that the effect on the spasmodic element has seemed more decided than that upon the catarrhal (*Lancet*, September, 1863).

Colchicum.

Gout.—In our days this remedy has been pretty generally abandoned in the treatment of dropsy and asthma, while it has taken a position at least equally brilliant in that of rheumatism and gout. In 1814 several

English physicians proclaimed with enthusiasm the happy effects in gout; they were led to it by the good result of some cases treated with Husson's medicinal water, into the composition of which colchicum enters. In England, J. Want, and Everard Home; in Switzerland, Locker and Balber; in France, Lobstein of Strasburg; and more lately a large number of other physicians have published cases of cure of gout by alcoholic tincture and wine of colchicum.

Dr. Fiévée is one of those who have praised colchicum most in France, and has obtained the most happy results. During the twenty-four years, he says, in which he has used colchicum, thousands of facts, carefully studied, have confirmed the efficacy of this remedy, and make its action in the treatment of gout and rheumatism as sure as that of sulphate of quinia in intermittent fevers ("De la goutte et de son traitement spécifique par les préparations de colchique," 1845).

Dr. Galtier-Boissière, in his work on gout,* recommends, in order to prevent bad symptoms from the use of colchicum, the following precautions, which he himself adopts:

1. To give it only for the relief of excessive gouty pains, and to permit the various continued graduated exercises which, in his opinion, form the only sure specific for this diathesis.

2. To give it in tincture, made with 1 part of colchicum seed and 8 parts of alcohol at 33°.

3. To begin with the dose of 1 gramme of tincture (ℳ. xv.) and never to exceed 8 grammes in the twenty-four hours.

4. To dilute carefully each gramme of tincture with at least fifty times the amount of sweetened water or ptisan of ash-leaves or gentian, or very weak tea or coffee.

5. To put at least one day's interval between every two doses, if more than 4 grammes of tincture have been required to relieve the pains.

6. Especially, to suspend the use of colchicum as soon as it produces more than four stools per diem.

Lartigue's pills, which have a certain reputation in the treatment of gouty affections, very probably have colchicum as their active principle.

We are very unwilling to question the numerous facts quoted by respectable physicians; but if we readily admit that colchicum, like many purgatives, may retard, attenuate, and even cure attacks of gout, we are not so fully prepared to believe that it cures the gouty diathesis, and permits the patient to remain long without fresh attacks. We have known patients who, when gout was impending, suppressed the attack by purgative pills; they were thus able for several years to avoid gouty symptoms; but the remedy soon became insufficient, and they paid for it with a severer and longer paroxysm than any of those they had been delivered from.

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* "De la goutte, de sa nature, de ses causes et de son traitement préservatif, palliatif et curatif," par le docteur Galtier-Boissière, Paris, 1860, pp. 110, 112.

In acute rheumatism, the success of wine and of tincture of colchicum has been proclaimed with as much enthusiasm as in the case of gout; but the experiments which we have made prove, that if colchicum had an evidently good effect on rheumatism, the influence was on the whole not more evident than that of drastic purgatives, with which we experimented comparatively. But when in acute or chronic rheumatism we have given colchicum so as to produce no laxative effect, we have observed no appreciable effects, and often merely fatigued the stomach.

It is nevertheless possible that at that time (our attention not being directed toward it as at present), we ascribed too exclusive a part to the purgative and revulsive effects of colchicum, at the expense of its sedative and controstimulant property ("Podagram dysenteria solvit"—Hipp.).

The sedative action on the pulse cannot be questioned, even when it causes no purgation. But this sedation is more marked in gouty than in ordinary phlegmasiæ.

The explanation of this specific action has been sought in the composition of the urine, and the increased excretion of urea and uric acid announced by Chelius, and afterward by Christison and MacGregor Maclogan. But Garrod correctly remarks that these observers did not attend to the variations which the urine of gouty persons undergoes under the influence of purgations, to the quantity of urine passed, or the period of the disease, for the urine is often seen charged with uric acid at the decline of the attack.

Graves, who shares the opinion of Garrod, thinks that colchicum opposes the formation of uric acid in the blood, and to sustain his hypothesis he cites the chemical analysis of the blood of several gouty persons.

If it is true that colchicum has been of advantage in chorea, ophthalmia, dartre, etc., we admit the revulsive action, but must also keep in mind the other properties; for we shall see that veratria possesses a sort of elective action upon the nervous and muscular system, not to speak of its controstimulant and antiphlogistic effects, which are perfectly established.

Veratria.

Acute articular rheumatism.—Veratria was little used, even externally, until Piédagnel, doubtless guided by the old reputation of colchicum, tried veratria in acute articular rheumatism. His method was as follows:

He used pills, each containing 5 milligrammes of veratria (gr. $\frac{3}{40}$). Of these he gave one the first day, two the second, and thus increased by one pill daily until six, or rarely seven, were taken. When the general and local symptoms were very considerably improved (which usually occurs from the fourth to the sixth day of treatment), the dose was not increased, but was kept as on the day before. If the patient was taking 4 or 5 pills when improvement commenced, he continued a day or two at this dose,

then diminished gradually as the symptoms lessened, returning to 4, 3, 2, and 1 pill, ceasing entirely when the cure seemed perfect after four or six days.

If troubles in the digestive organs appear while veratria is taking, if colics, diarrhœa, or vomiting indicate an inflammation or an intolerance of the gastro-intestinal mucous membrane, we must respect the susceptibility of the digestive organs, and stop at the dose which is taken without provoking irritation. The pills are given in a teaspoonful of water or ptisan, with intervals between them, according to the number to be taken in a day.

We were the first to repeat the experiments of Piédagnel, and will say that veratria has been in general quite satisfactory in acute articular rheumatism.

The most constant effect of this treatment in frank inflammatory rheumatism is to check, usually in a few days, the febrile movement, and to lessen the pain, often still more quickly. An acute articular rheumatism, in a young, vigorous, sanguine person, with very intense febrile reaction, has been brought quite speedily, by the aid of veratria alone and without bleeding, to the condition of a rheumatism of moderate intensity; and by continuing the use of the remedy it is not rare to conquer an attack in seven or eight days of treatment.

The result, however, is not always so happy. Along with those rapid and solid cures we also see rheumatism, reduced to a subacute state and a more benign form, continuing or suspending their progress, but reappearing later, so as to make good the duration of two or three weeks, so usual in this affection.

The property of veratria seems to us not specific; it is analogous to that of sulphate of quinia and large doses of nitre, that is, it acts like a controstimulant. In a disease in which the inflammatory element is associated with the element pain, as in acute rheumatism, the sedation of pain and the almost immediate sedation of the great circulation can but exercise a general happy influence.

If veratria gives no more cures than any other remedy, it seems to us at least to have the advantage of lessening the fever, of making the pain supportable from the first days, without excessively enfeebling the patient, or causing anæmia, or excessively prolonging convalescence, as is the case so commonly after repeated bloodletting. In the numerous cases of weak or anæmic persons, or those previously affected with chronic diseases, especially in the relapses of rheumatism, in a word, in all the cases where bloodletting is formally contraindicated, veratria will be forced to to take the place of the latter remedy; and in this respect it will stand by the side of sulphate of quinia, which will, however, deserve the preference in the generality of cases. Its cheapness will often enable veratria to replace sulphate of quinia for practice among the poor.

The first successes of veratria led to other trials; the sedative and controstimulant virtues, so advantageous in acute articular rheumatism, nat-

urally suggested the idea of using it in some other inflammatory diseases. It was used in angina, in pleurisy, in acute engorgement of the breasts, and especially in pneumonia. Aran made these experiments on the largest scale among us. For a time all the patients with pneumonia who came under his treatment in hospital were treated almost exclusively with veratria. The physiological effects of the drug have quite a close analogy with those of large doses of tartar-emetic; thus, on the first or second day, phenomena of gastro-intestinal irritation, then more or less incomplete intolerance, and quite rapid diminution, more or less marked, of the chief febrile and inflammatory symptoms. The final results, as a whole, seem to have been quite good, and to resemble those of antimonial treatment. But as the application of the method in pneumonia has been hardly more than individual, and as few physicians have hitherto repeated the experiments, it seems to us prudent to wait before giving judgment. But we think we hazard nothing in predicting that the reputation of tartar-emetic in the treatment of pneumonia is so well established and so merited, that it is sure to retain for a long time the superiority over any contro-stimulant which may be used as a substitute.

Aran, urged by the good results which he obtained in some frankly inflammatory affections, thought himself justified in generalizing the use of veratria, and in giving it in other diseases, which, though different from the latter in nature, nevertheless resembled one another in the intensity of their febrile symptoms; we refer to the eruptive fevers, especially variolæ and scarlatina.

He states that he has succeeded, especially in scarlatina, in diminishing the symptoms of local phlegmasia of the throat and skin, and in considerably lessening the direction of the disease. But this profession (which will be contradicted at once) needs for its proof more numerous and unquestionable facts.

Aran has also applied veratria in typhoid fever. But this extension seems to us to be without legitimate justification. How can we hope that this disease, which is essentially and fundamentally asthenic (though it may accidentally and transitorily assume the inflammatory form), can adapt itself to a toxic agent of which the immediate and constant effect is to depress the vital force profoundly, and which has the further grave disadvantage of irritating the digestive tube? Veratria seems to us *a priori* formally contraindicated in typhoid fever. The results agree perfectly with our theoretic way of looking at the matter, and we believe that, such as they are, they will encourage no one to make further trials.

From these considerations we think ourselves justified in concluding that veratria ought to be excluded, at least as a general remedy, from the treatment of the eruptive and typhoid fevers, and we think that its use should be confined to some phlegmasiæ with intense febrile reaction, seated in the serous and synovial membranes, and especially rheumatic and gouty affections, and some anomalies of the nervous system of organic life, which seem to be under the control of the gouty diathesis.

To ask too much of it is to risk doing harm, and will almost certainly compromise a remedy which, if well placed and kept within just limits, may be very useful.

Affections of the heart.—Dr. Bitot, Professor at the École de Médecine at Bordeaux, has lately used veratria to relieve nervous palpitations, and even hypertrophy of the heart, in patients who had œdema of the lower limbs. He several times obtained a very rapid relief, even when digitalis had failed. He prescribes as follows:

℞. Distilled water	100	grammes.
Veratria	0.05	"
Alcohol	q. s.	
Syrup of orange-flowers	60	"

M. Take a teaspoonful every hour.

As this causes a sensation of acrid heat in the throat and down to the œsophagus, Bitot substituted granules of veratria, containing one milligramme, at first three a day to be taken, and then progressively increasing according to tolerance until eight or ten per day are taken (Congrès de l'Association Française tenu a Bordeaux, 1872, séance du 9 septembre).

CHAPTER XIV.

ANTHELMINTICS.

We have now to study very briefly a class of remedies to which insufficient importance is generally attached. *Anthelmintics* are the remedies which are used to destroy and expel intestinal worms; those which destroy the worms are called *vermicides*, those which expel them, *vermifuges*. Among the vermicides, all that are purgatives are also vermifuges. The latter do not form a separate class, as they enjoy the property of expelling intestinal worms by no special action on the creatures, but by the simple increase of intestinal secretion and peristaltic movement. It follows that it is incorrect to make two classes of anthelmintics, and that only those deserve to be so called which have a toxic action upon the worms.

Mercury.

At the head of anthelmintics stands mercury. We have already spoken of its great influence upon the lower animals, and the eggs and embryos of the higher animals. It is easy to explain how they kill worms in the intestinal canal. Liquid mercury is given, but it is the worst form; or mercurial ointment in pills, in the dose of 4 or 5 decigrammes (gr. 6—8) once or twice a day; or, still better, powdered calomel, in the dose of 2—5 decigrammes (gr. 3—8), one, two, or three days in succession.

The anthelmintic electuary of Heister is prepared as follows:

℞. Mercury ..... 16 grammes (ʒ iv.).
Carefully extinguish in 32 grammes (℥ i.) of mucilage of acacia, and add:
Powdered cinchona ..... 32 grammes (℥ i.).
Syrup of mint ..... q. s.

to give the consistency of an electuary. A piece as large as a hazelnut is given morning and evening.

The vermifuge pastilles of Barthez contain nothing but calomel and sugar.

In some formulæ, calomel and semen-contra were associated, as in the anthelmintic electuary of Vogler (a very powerful remedy), in which they were added to jalap-root; and in the antimonial ethiops of Huxham, mer-

cury, sulphide of antimony, and flowers of brimstone were triturated together, and the powder given to children in the dose of from 4 to 6 grammes.

Calomel is particularly recommended in the treatment of ascaris lumbricoides; but when oxyuris vermicularis is to be destroyed, which lives in the large intestine, it is well to inject into the rectum a little mucilage of gum arabic or linseed, holding in suspension from 5 to 20 centigrammes of calomel, or still better, 200 grammes ($\frac{2}{3}$ of a pint) of distilled water in which from 2 to 10 centigrammes (gr. 0.3—1.5) of biniodide of mercury is dissolved by the aid of a certain quantity of iodide of potassium.

We should remember that we cannot kill at once all the oxyures and all the eggs. If only one dose is used, a new brood will spring up in five or eight weeks. We usually order the treatment three days successively, then three times from week to week, then three times from fortnight to fortnight, and the tenth dose a month later. In this way the new generations are destroyed as they develop, and the disease is really cured. Without this precaution, we run the risk of seeing the oxyures perpetuate themselves for several years.

Corsican Moss—Semen-Contra—Pomegranate Root—Male Fern, etc.

The fucus helminthocorton, or Corsican moss, is a vegetable which is chiefly found on the rocks bordering the sea in Corsica and Sardinia. That which is used in the shops is almost always mixed with many other marine algæ, which have similar properties. The use of this moss as an anthelmintic would seem to go back to a remote antiquity (Mérat et de Lens, "Dict. de mat. méd.", t. IV., p. 497). But its properties were first made known in 1775, according to Sprengel, by a Corsican physician, Stephanopoli.

The plant has no noticeable bitterness. Its mode of action upon the worms is not easy to understand from its taste and its immediate principles. In fact, however, it is one of our best vermifuges. It is given to children in decoction, in milk well sweetened, in the dose of 4 to 16 grammes (℥ i.—iv.). A jelly is also made with red wine and white sugar, which does not displease children, and is given in the dose of 2 or 3 tablespoonfuls a day.

Semen-Contra.

In the genus Artemisia, mugwort and absinth possess anthelmintic properties. Another plant, or rather, several other species of the same genus, comprised under the common name of Artemisia semen-contra, are evidently superior to mugwort and absinth as anthelmintics.

Semen-contra is chiefly given in powder, in the dose of 4 to 8 grammes

(ʒ i.—ii.) in twenty-four hours, in soup or bouillie, in boli, or in an electuary. Biscuits, dragées, confections, and gingerbread, are made with it. It is also taken in infusion, from 6 to 12 grammes to two cups of boiling water or milk.

A very convenient way of giving it to children is to cover the little heads with sugar, as is done with anise-seed.

Santonin is chiefly given in the form of dragées, each containing 5 centigrammes (gr. $\frac{3}{4}$) of this substance. It has the very singular property of making people who take it see everything green ; but no explanation has been given of this phenomenon.

Pomegranate Root.

The Punica granatum, of the family of the granateæ (De Candolle), is a pretty shrub growing in warm countries, formerly placed in the family of the myrtaceæ. Its opened flowers, known as " balaustes," and the pericarp of its fruits, called " malicorium," are good astringents.

The bark of the root was anciently used for tænia, as mentioned by Dioscorides, Pliny, and Celsus. Since the time of these physicians, no more has been heard of the root, except in the fourth century from Marcellus Empiricus. This precious remedy was entirely forgotten, when Buchanan, a physician of Calcutta, called the attention of the medical world to it. Other English physicians mentioned it with praise. Gomez, of Lisbon, made experiments upon the tænifuge virtues of the bark and published a mémoire, which was translated in 1823 in the *Journal complémentaire des sciences médicales*, and popularized the remedy. Since then there are few physicians in hospitals who have not had several occasions to learn the admirable properties of this drug.

The bark of pomegranate is given in powder, decoction, or extract. In powder, the dose is from 4 to 8 grammes (ʒ i.—ii.). This is not a good form ; the decoction is better—64 grammes (℥ ii.) of the fresh bark are boiled with 750 grammes (Oiss.) of water, which is reduced to 500 by boiling. This decoction is taken in three doses, leaving the interval of an hour between. If on the next day the patient has not passed the worm, a drastic purgative is given ; and so again, three times during nine days. This rarely fails to kill the tænia.

Laboulbène has modified this formula a little. He gives from 60 to 90 grammes (℥ ii.—iii.) of the Portuguese bark, which is set to macerate for twenty-four hours in two glasses of water. At the end of this time the maceration is warmed, at first at a gentle fire, then by a hot fire to reduce the mass to a single glassful. This may be taken in one dose ; but if there is a tendency to vomit, it must be taken in two portions, for it is bitter and disagreeable.

As soon as the patient feels a disturbance in his bowels, and intestinal contractions, or colics, castor-oil is given—from 15 to 60 grammes

(ʒ iv.—xv.) in one, two, or three doses; Laboulbène gives, if necessary, 100 grammes (ʒ iii.).

Mérat recommends the same remedy to destroy strongylus and ascarides. It is well to give it in injections, to destroy the worms, which lodge in the rectum and produce troublesome itching.

We generally prefer the fresh bark of the root of wild pomegranate. That which is sold in the market is not to be trusted, for it seems (says Laboulbène) that the shrub has been grafted upon other plants, when it is difficult to tell what root is given.

Male Fern.

Tænia.—Man is liable to several kinds of cestoid worms (κεστός, festoon); the tænia solium, or armata, the t. mediocanellata, or inermis, without hooks, and the bothriocephalus latus, or large worm. The two former are most common in France, Africa, and certain countries in Asia; the last in Switzerland, particularly Geneva. Before the war of 1870, the most common form at Paris was the t. solium, while in the east of France, particularly in Strasburg, the t. inermis was the most frequent.

Since the war this has changed. At first, tænia became much more common; the hospital physicians observed it, and it was established in a positive manner by Regnauld, director of the central pharmacy of the hospitals. In a letter addressed to Besnier, general secretary of the Société médicale des hôpitaux, we find the following figures, showing the average annual consumption of the tænicides in the hospitals of Paris (in kilogrammes and decimals):

	Annual Average.	
	Before 1870.	After 1870.
Kousso	3·900	9·000
Pumpkin seeds	3·000	5·311
Pomegranate	13·008	14·025
Male fern	5·147	12·100

This increase is not equal in the two species. We were the first to point out that since the war the tænia inermis had singularly increased, so that since this time we had scarcely found any but the tænia inermis, and hardly any tænia solium.

There has been no error of diagnosis, for all the worms were examined scrupulously with the microscope, and there is no danger of mistaking t. solium which had lost its hooks for t. inermis.

We also remarked that, among these t. inermes, some had white heads, and some had black, owing to a pigmentation which surrounds the valves, but we cannot say whether this coloration indicates a difference of age or of origin.

To what is due this increase in the number of the tænia, especially of the t. inermis?

It is believed at present that the tænia is not contracted before weaning, and that the child is exempt as long as it is exclusively fed with the breast-milk.

It is also admitted that the tænia breeds by alternate generation. When a person swallows eggs of tænia, free or enclosed in the proglottis, these eggs give rise only to cysticercus, cœnuris, or echinococcus, which fix themselves usually in the liver, the brain, and exceptionally in the interior of the eye. In the pig this multiplication is easier, and the vesicular worms lodge in all the organs, and fix themselves in the submucous cellular tissue, especially under the tongue; experts examine this portion especially, and for this reason are called *langayeurs*.

If man introduces into his digestive passages cysticerci proceeding from an herbivorous animal, an ox or a pig, there develops in his intestine a tænia which, it is hard to say why, is usually single, whence the name "ver solitaire," though sometimes two or more are met with.

The tænia in man commonly originates from the ox or pig. Leuckart's observations showed that the tænia armata comes from the pig and the t. inermis from the ox and calf. We can now explain the increased frequency of the latter, first by the introduction of raw meat into therapeutics, and secondly by the fashion of eating the meat more and more raw; while in the army, where only boiled meat is used, the solitary worm never occurs, as one may say.

Collin shows that the French garrisons are hardly ever troubled with tænia, but that it is otherwise in the African army, and that in the Syrian expedition one-third of the corps were attacked. The expeditionary force in China was infested with it, as are the English troops that are sent to India.

With a little attention, it is easy to distinguish the two sorts when the subject is entire, or even the head is present. But it is well to know if the diagnosis can be made earlier.

When a patient presents nervous troubles of the digestive system, gastralgia, bulimia, colics; fixed painful points, with the sensation of vermicular movements of the circumvolutions, a sort of creeping, with vertigo, clouds before the sight, sometimes a cough analogous to that of the hysterical; itching around the mouth and anus, it is proper to recall the old adage "Tæniam cogita;" especially if there are epileptiform attacks without the frank character of epilepsy.

In any case, the diagnosis is not positive unless the patient has passed, either spontaneously or by the action of a special purgative, joints, the nature of which is recognized, and not strips of epithelium or débris of food which resemble them. When the diagnosis is confirmed, Laboulbène has given a means of deciding whether there is a tænia inermis, or a solium, before the head is passed. If the patient discharges (not by stool) fragments in separate joints, it is almost certain that there is a tænia iner-

mis, while the t. solium is only passed in defecation, with the stools and in much larger fragments. The diagnosis will be certain if the joints are large, and if the genital pores on the edges do not follow a regular alternation, but present five or six pores on one side and several on the other, instead of one on the right followed by one on the left in a regular way. The eggs enclosed in the joint or proglottis are oval in t. inermis and spherical in t. armata.

When the tænia is once diagnosticated and specified, how shall it be expelled? First, we should choose the period when the patient passes it spontaneously, as far as possible. But if the patient has, under treatment, recently passed the chief part of his worm, we had better wait several months in order to let it develop anew. When the use of a tænicide is determined upon, the digestive tube must be emptied to facilitate the operation and the discovery of the worm. This is done by putting the patient on milk diet on the evening before, or by giving him only thin soup and cooked fruit or jam; and by giving on the next morning a whole injection before giving the vermifuge.

The tænicide which we most frequently use is the ethereal extract of the shoots and fresh roots of male fern, to which we add, after the method of Créquy, a certain dose of calomel.

Limousin has prepared for this purpose capsules of gelatine, each containing half a gramme of extract of fern and 5 centigrammes of calomel. The patient takes 16 of these capsules, or 8 grammes of extract of fern and 0·80 grammes of powdered calomel (ʒ ii. and gr. xii.).

The patient takes these capsules, two at a time, every ten minutes. This operation, commenced at seven o'clock, ends about nine o'clock.

Two hours later the patient begins to go to stool, and generally has four or five in the space of two hours. The worm is passed at the second or third stool. As the digestive canal was previously emptied, the worm is easy to distinguish, and if a certain precaution is taken, it may be obtained in one piece. The precaution consists in making the patient sit in a bucket of water, so that the part which first comes out floats, and does not drag on the rest with its weight. Thus the worm is not broken, and the head, being in connection with the rest, is easily found. We insist on this precaution, as, if the worm breaks, we may remain ignorant whether the head is passed. The nervous symptoms sometimes persist for a time after the expulsion of the worm, and might lead to the belief that we had failed, if we could not show the head.

Calomel, in this case, acts much more promptly than when it is given alone, and its action is much more promptly finished.

In two hours all is over, and about one o'clock the patient may breakfast as usual.

The leaves of fern are now generally substituted for oat-straw, for children's beds; they exhale a very pleasant smell, and are said to preserve children from worms.

Brayera Anthelmintica, or Koosso.

The plant is of the rosaceæ. The part used is the flowers, or rather the inflorescences of the tree, which the Abyssinians use under the name of Kousso, Kwso, Cousso, Coso, Habbi, and Cabots, names given to the tænia, which is expelled and killed by this substance. As known in Europe, it looks like linden-flowers bruised; it has an insipid, mucilaginous taste, afterward acrid; its smell, developed by contact with hot water, recalls a little that of elder-flowers.

Koosso is used in powder, in the dose of 15 or 20 grammes (ʒ iv.—v.), mixed with 250 grammes of boiling water; it is infused half an hour, and the whole is swallowed, powder and liquid. As koosso provokes thirst, and drinking must be avoided, Boggio gives a lemon to be sucked. The Abyssinians add a purgative, which is useless in most cases, for the substance usually produces evacuations; but if the latter do not occur an hour after the remedy is taken, a bottle of Sedlitz water may be given.

Koosso causes neither fever nor colics; the head of the tænia, which is in the form of a very fine thread terminated by a sort of valve, is not generally expelled until the third or fourth evacuation; one dose usually suffices, but if necessary it may be repeated without harm.

The powder has a nauseous taste, which makes its administration difficult. A pharmacist of Paris, Mentel, has it granulated with sugar; thus prepared, nothing is easier than to give it to children. Gérin-Roze has found it efficacious in three cases.

Saoria—Tatze.

M. Strohl, agrégé à la Faculté de médecine de Strasbourg, has made known these two new exotic tænifuges. They come from Abyssinia, which furnishes koosso. We will give some details from the *Gazette médicale* of Paris.

1. Saoria (sanarja) is the ripe dry fruit of mæsa (bacobotrys) picta, Hachstetter, and not of the mæsa lanceolata, Forskal. The fruit is an ovoid drupe, of a greenish yellow color. It has about the bulk of pepper; its taste is at first a little aromatic, oily and astringent, and shortly afterward leaves in the back of the pharynx a very persistent sensation of acridity.

According to Schimper, the fruits, fresh or dry, are the best and surest vermifuge. The dose when dry is from 32 to 44 grammes (ʒ i.—ʒ xi.); they are powdered, and given in a purée of lentils or a flour-broth. The drug causes purging, kills and expels the worm whole, and has little effect on the health, which is not the case with koosso. Saoria exists in all parts of Abyssinia, and might probably be cultivated in Europe and become indigenous there.

Some dislike the taste, but bear it easily; others notice it less, and in all cases it is much less disagreeable than that of powdered male fern and decoction of pomegranate root. The local effects are few; usually limited to a few colics and a moderate purgation, never followed by diarrhœa. This effect seems to come from a special coloring matter.

The method of administration formulated by Strohl is as follows: moderate diet during the day, and soup on the evening before giving the drug; next day, fasting, 30 grammes (℥ i.) of the powder in a liquid, an infusion of any sort, sugared or not. If there is nausea, it may be calmed by mild aromatics. Usually there will be liquid stools two or three hours afterward, in which the tænia is found dead. If there is no purgation, castor-oil is given during the day. Regimen light on the same day; on the next, if the stools have been few and the digestive tract is not fatigued, some evacuations may be procured to drive out the remains of the tænia. If the head is wanting, nothing prevents a new administration four or eight days later.

A new remedy has lately been sold, under the name of "Tænifuga Puy." It is said to be a hydro-alcoholic extract of Saoria, pumpkin-seeds, lemon and purslain. The preparation is dissolved in water in administration.

2. The fruits called Tatzé (varch) are produced by a shrub of the family of the myrsineæ, the myrsina Africana (L.).

The fruit is as large as a juniper-berry, a monosperm drupe by abortion, with crustaceous kernel, glabrous free, of a reddish brown color, and a taste less aromatic and oily than that of saoria, more astringent, but developing much more quickly the sensation of acridity, roughness and burning, more intense and more persistent.

Schimper says that these fruits, either dry or fresh, are a powerful tænifuge. The ordinary dose of the dry is 15 grammes, at most 24, reduced to powder and mixed with water. The last dose should only be given to persons of robust constitution. This plant is more widely spread than the preceding, and probably could be acclimated in Europe.

The taste is more repugnant than that of Saoria. Sometimes there is vomiting; never colics; the purgative action is not constant. It rarely produces general symptoms. It is a tænicide, and seems also to have an action on the urine, which it makes very dark.

Tatzé is a potent tænifuge, said to be superior in activity to our indigenous vermicides in general, and particularly to the pomegranate, from its facility of administration and its innocence.

It should be given in powder and mixed in ptisan, an aromatic infusion, water, or sugared water; if in three or four hours it produces no stools, or if the stools contain no entozoön, castor-oil is given.

Moucenna.

After these two new tænifuges, we must say a word of a third, called moucenna, mucena, mussenna, mussanna, concerning which Dr. Burguières has communicated the following note:

The bark of the tree, called by the Abyssinians moucenan, is considered in Abyssinia as the chief remedy for killing and expelling tænia.

Koosso, which those people use frequently, is regarded by them as only a palliative. They take a dose of it every month to prevent the worm (to which they are very liable) from reaching a large size, and to preserve themselves in a condition which in their eyes is the type of health. The tænia, if kept within certain limits of development, is regarded by them as a sort of salutary emunctory. When the annoyance becomes great, and they wish to get rid of him entirely (which they do with the greatest secrecy), they take 3 or 4 ounces of the bark of moucenna, well powdered, and mixed with a certain quantity of honey, dieting on the day before they take it. In a few hours the tænia is passed, not, as in the case with other tænifuges, in strips of various lengths, but in the form of a curdled bouillie.

The bark has long been known and valued in Egypt; but until very lately travellers from Abyssinia brought it back very seldom and in very small quantities. It may be obtained to-day quite easily. "I have had repeated occasion," says Burguières, "to prove its efficacy and its mode of action, both among the Abyssinians living in Cairo and among the native Egyptians, and even Europeans. An English lady living in Cairo had tænia, which had produced severe symptoms and the commencement of ascites; two doses of moucenna, given in the form of extract, cured her rapidly and radically."

M. Courbon, a naval surgeon, has published a very interesting paper on the Abyssinian tænicides. M. Fournier has sustained a very remarkable thesis upon the botanical study of these plants, in which moucenna is attributed to Albizzia anthelmintica, of the family of the leguminosæ.

Moucenna forms with honey a magma which is hard to swallow, which causes disgust and often vomiting; but this is the only trouble produced by the remedy, which never excites colic. As we said, the extract may be given; but the best method of preparing this extract remains to be ascertained.

Schimper, who has collected very precise and valuable statements concerning the Abyssinian anthelmintics, and who was for many years English consul at Aden, adds to kousso, saoria, tatzé, and moucenna, the following:

1. Habbe tschakko, oxalis anthelmintica (A. Brown), oxalideæ; the bulb is used.

2. Habbe zelim, jasminum floribundum (A. Brown), jasmineæ; the leaves.

3. Bolbida, celosia adoensis (Hoche), amaranthaceæ; leaves, flowers, and fruits.

4. Roman, punica granatum; bark of the root.

5. Angoga, an indeterminate plant; fruit.

6. Ogkert, silene macrosolem (Hoche), caryophylleæ; root.

A German physician has added to this long list albatsjago or medjamedgo, a product of unknown origin, also much used by the Abyssinians. The barks of Geoffroya surinamensis and inermis are also mentioned.

Soot.

Injections made with a decoction of soot are very useful in destroying the ascarides which inhabit the extremity of the intestine. The strongyli and the worms living in the stomach and small intestine are often easily expelled by taking a kind of coffee prepared with 7 grammes (gr. 105) of roasted and ground coffee with an equal amount of soot; if properly sweetened, children do not object to taking this.

Kamala.

This is the Indian name of a red powder, from the capsules of the Rottlera tinctoria, which has long been used in dyeing. Hanbury first mentioned the substance, and Guibourt and Dorvant described it; Anderson had extracted from it a substance which he calls rottlerine.

In spite of the observations of Mackennon, Anderson, and Arthur Leared, kamala has been little used. We have seen it given twice successfully at the Hôpital des Enfants-Malades.

Blondeau expelled a tænia with 25 grammes (℥ vi.) of tincture. The patient had neither nausea nor colics (Société de Thérapeutique, 28 avril, 1875).

Forms and Doses.

Powder: 1—12 grammes (gr. 15—℥ iii.) suspended in a liquid.

Alcoholic Tincture (Anderson).

℞. Kamala..... 180 grammes (℥ vi.).
Rectified alcohol..... 380 " (℥ xiiss.).

Macerate and strain. Dose, 4—16 grammes (℥ i.—iv.) in an aromatic drink.

Spigelia Anthelmintica.

This is a plant of the family of the gentianeæ. It comes from South America, Brazil, Cayenne; it is common in the Antilles; its dried leaves are dark green, smell like the roots of arnica and pyrethrum, and taste acid and bitter.

Bennewyn considers it as the remedy *par excellence* to destroy intestinal worms.

A decoction is made by taking an ounce finely cut up, boiling in a covered vessel for a good quarter of an hour, with enough water to leave about 250 grammes (Oss.) of strained liquid, and after decantation adding 60 grammes (℥ ii.) of syrup of peach-flowers or mulberry.

Pumpkin-Seed.

The seeds of Cucurbita pepo were recommended thirty years ago as possessing tænifuge properties.

In 1845 Brunet communicated to the Bordeaux Society of Medicine two cases of the cure of tænia by the paste of pumpkin-seed. Soon after Sarraméa presented to the same society two tæniæ which he had expelled by the same remedy. A little later (1852) Brunet announced to the same society that he had used the remedy twenty-five or thirty times with success.

Mongenay, Cazin, and Girard, of Marseilles, also had successful cases. Our colleague, Vidal, physician at the Hospital Saint-Louis, relieved himself by taking a looch composed of 100 grammes (℥ iii.) of the seeds and an ounce of castor-oil.

The remedy is mostly used for children, for whom looches are made with the addition of 15—45 grammes (℥ ss.—iss.) of the peeled seeds; two hours later they are made to take a dose of 10 or 15 grammes (3 or 4 teaspoonfuls) of castor-oil (Roger, Archambault).

This remedy is rarely used for adults, as its action is not constant. The active principle is not known. Hérard thinks it is in the kernel, Lelièvre of Chaton, in the gemmule. Heckel thinks that it is in the endopleuron, the greenish pellicle which envelops the kernel (Académie des Sciences, 25 septembre, 1875).

Heckel attributes the failures to the fact that the seeds were stripped of the second or gum covering. To prove that this is the active portion, he gives it exclusively. It is obtained by stripping the seeds while dry. The membrane is collected in the proportion of five per cent. in weight. The seeds are first husked, then boiled in water ten minutes, and the endopleuron is detached by pressing the seed between the fingers.

When desiccated, the membrane is pulverized and mixed with a quan-

tity of sugar and gum to form pastilles, which are taken after swallowing an ounce of castor-oil. In general the tænia is expelled during the evening.

Heckel has isolated a resin from this membrane, which he calls pépo-resin. A dose of $\frac{3}{4}$ of a gramme (12 gr.) in six pills, without the addition of castor-oil, ordinarily suffices to kill the tænia. This dose represents 17 grammes of green membrane, or 250 grammes ($\frac{1}{2}$ pound) of peeled seeds.

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